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INTERNATIONAL SCIENTIFIC DAYS 2018

„Towards Productive, Sustainable
and Resilient Global Agriculture and Food Systems"

Conference proceedings

May 16-17, 2018 Nitra, Slovak Republic

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Many thanks to all international partners which have contributed to this event.

Foreword

Dear colleagues and friends,

At this very moment you are opening the book of proceedings from the international scientific conference International Scientific Days 2018 organized under the theme: „Towards Productive, Sustainable and Resilient Global Agriculture and Food Systems" by the Faculty of Economics and Management of the Slovak University of Agriculture in Nitra, Slovak Republic. This conference with over 250 participants from 24 countries is very good starting point for presenting new ideas or critical statements, sharing information and for establishing cooperation. International Scientific Days 2018 cover according to the OECD vision for the 21st century all inevitable topics such as food markets, water management, productivity growth and climate change.

We know that agriculture is the foundation for a promising global future. Task of policy makers, academic sphere and all stakeholders is to consider which policies could help us to feed a growing human population, protect natural resources, and support farmers and rural citizens. In the same time, business priorities for future OECD activities at the global food system are focused on the key pillars of trade, innovations in agri-food chain including faster adoption of green growth innovations, diets, nutrition aspects and sustainability as well.

International Scientific Days 2018 have been organized in partnership with ASECU, the Association of Economic Universities of South and Eastern Europe and the Black Sea Region and in the same time serves as the platform for presentation of results of two international strategic partnership projects, project SOILS "Sustainability of Small and Family Farms" coordinated by the Faculty of Economics and Management of the Slovak University of Agriculture in Nitra and project CATALYST "Capacity building in agricultural innovation services in Central Eastern European countries"

I would like to take this opportunity to thanks all policy makers, academics, researchers, mangers and sponsors which accepted our invitation and became active member of the conference. My special thank belongs all of the people who made this conference successful and valuable experience for each and every one of us.

Elena Horská
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SESSION 1

FOOD SECURITY, TRADE AND AGRICULTURAL POLICY

THE ROLE AND PLACE OF THE STATE IN THE DEVELOPMENT OF UKRAINIAN FARM HOUSEHOLDS

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Abstract

The main objectives of our research are: analysis of the economic efficiency of the farm households functioning; assessment of the effectiveness of state support for the production of agricultural commodities in farm households; development of mechanisms of farm household state support taking into consideration Ukraine's membership in the WTO. It is the determined stimulation of the development of farming and service cooperatives is an extremely important task. It was determined the main reasons for low effectiveness of farm households. Clarified other problems which farm households face nowaday sand the main reasons for low effectiveness of farm households

Keywords: *farms, competitiveness, economic support, state policy instruments*

JEL classification: *H 70, Q 13*

1   Introduction

The transformations taking place in the agrarian sector of the Ukrainian economy led to the formation of various forms of ownership and business entities based on private ownership of productive assets, labor and free enterprise, which include farm households that make their significant contribution in the development of agricultural production and play an important role in enhancing the competitiveness of the agrarian sector of the economy.

Therefore, the agrarian policy pursued by the State should be based both on the interests of the agrarian sector of the economy as a whole, as well as on individual economic entities. Measures of economic support should take into account

the existing division of labor between large and small forms of management, as well as the changes taking place in these forms of management in order to create conditions for their further functioning and development.

Farm households, which have flexibility and mobility in a market economy, create the conditions for its stable development. These households promote stronger socio-economic motivation for effective work, increase the use of available natural, economic, material, technical and labor resources and meet necessary food needs of the population.

2   Data and Methods

The study used statistical data from the State Statistics Service of Ukraine, methodological publications and annual reports of Eurostat, ministries and departments of Ukraine, own results of scientific researches of the author, reference and information publications, Internet resources, etc. In the process of research, the following methods were used: statistical analysis – to study the dynamics and structure of the development of farms; problem-oriented – to substantiate the strategic directions of state support policy; comparison – to analyze the current state and development trends; monographic – for the study of production and economic activities of farms; grouping method – to analyze the results of the questionnaire; abstract-logical – for the formulation of conclusions.

3   Results and Discussion

Currently, the share of farm households remains small, namely at the level of 6-8% per year in the overall structure of gross agricultural production. At the same time, the main volume of farm products is generated in the field of plant growing – more than 90%. Until recently, the level of technical efficiency of production, particularly farm yields, in the vast majority remained significantly lower, compared to medium and large enterprises. The main reason for this state of affairs is a qualitatively worse own material and technical base of farms, the complexity of access to advanced technologies, breeding, use of plant protection products, fertilizers and other reasons, primarily due to the constant shortage of own working capital and limited access to credit resources. At present, unfavorable conditions for the farm households functioning have been created, which leads to a decrease in their number (Table 1).

Table 1 **The dynamics of the number of farm households in Ukraine, depending on the degree of participation in agricultural production**

Indicators	Year					2016 in % to:	
	2012	2013	2014	2015	2016	2012	2015
Total number of farm households	40676	40752	39428	39581	40946	100,7	103,4
Farm households not engaged in agricultural activities	6679	6956	7295	7278	7263	108,7	99,8
Farm households engaged in agricultural activities	33997	33796	32133	32303	33683	99,1	104,3
Of them:							
Large and medium	850	861	812	836	841	98,9	100,6
Small	33147	32935	31321	31477	32842	99,1	104,3

Thus, during the period 2012-2016, the total number of registered farms increased by 0.7%, or 270 units, and amounted to 40,946 units in 2016. The positive trend is to reduce the number of farms by 314 units that did not carry out the main activity in 2016 compared with 2012.

At the same time, it should be noted that a high proportion of farm households, which do not carry out economic activity in the total number of farms (17.8%), remains.

There is a negative tendency to reduce the number of large, medium and small farms. At the same time, the pace of decline of the latter exceeds the former. The main reason for the decline of small farms is their bankruptcy, large and medium – transformation into other organizational and legal forms.

Farm households did not become the leading producers of the main types of agricultural products due to objective and subjective reasons. Thus, the share of crop production was about 11.2%, livestock – only 2% in the total structure of gross output in 2016.

It should be noted that the narrow specialization of all categories of farm households is the cultivation of the main types of grain crops: wheat, maize for grain and sunflower.

This circumstance indicates a lack of long-term prospects of production and economic activity of farm households.

There is a steady tendency to increase the scale of agricultural production in the countries members of the European Union.

Despite the small size of the farms, European producers have achieved significant results in land cultivation and animal breeding. There is a positive dynamics in farmers engaged in livestock and crop production. At the same time, European farmers receive direct financial support. It accounts for more than two-thirds of all agrarian expenditures [1].

The expert notes that as concerns the social sphere of the agrarian sector of the EU countries, rural development policy deserves special attention. The funding takes place through a separate fund and regional programs. Interestingly, following the accession to the Union of new member States, measures of rural development in the system of farm support dominate.

Most US production control programs limit availability of farm products for average Americans and raise prices. This is an exclusive effect that is achieved in highly competitive economy by the power of the State, acting in the interests of farmers. Like most Western countries, the United States Department of Agriculture (USDA) provides pricing support programs for farmers and ranchers, assists them in managing their business by supplying information on commodity programs, sign up periods, payments, and qualification criteria [2].

For comparison, in the EU countries there is a single agricultural policy, the total support for the agrarian sector in the countries of the European Union was almost €60 billion annually in 2013-2014, which is about EUR 525/ha or 20% of gross agricultural output. Depending on the country, state support for the industry varies, in particular, in the Netherlands and Belgium – about EUR 500/ha, Poland – EUR 345/ha.

To compare, this indicator in Ukraine was in the range of EUR 10-20/ha in 2016, taking into account the funds remaining in the framework of the special VAT regime [3].

The main purpose of these programs is to provide stability or increase prices for the products of farmers and their income, although usually it is possible to achieve by raising the purchasing prices for agricultural products and the relative decline of their consumption.

During 2010-2016, the methods of state support for farm households underwent significant changes. Let's dwell on the analysis of their effectiveness. During 2010-2014, the use of direct budget allocations and VAT refunds was practiced (Table 2).

Table 2 **The dynamics of state support for farm households of Ukraine**

Indicators	2010	2011	2012	2013	2014
Total	448,2	626,3	934,5	836,6	1186,8
Incl. medium and large	219,7	338,2	420,1	390,7	585,9
Including per one farm household	267,5	399,8	494,3	453,8	728,7
Small	228,5	288,1	514,4	445,9	600,9
Including per one farm household	5,6	7,2	12,9	11,2	19,2
Budget grant – total	93,4	67,3	66,1	45,7	34,4
Incl. medium and large	29,8	22,0	9,9	12,7	7,1
Including per one farm household	36,3	26,0	11,7	14,8	8,8
Small	63,6	45,3	56,2	33,0	27,3
Including per one farm household	1,6	1,1	1,4	0,8	0,9
VAT – total	354,8	559	868,4	790,9	1152,4
Incl. medium and large	189,9	316,2	410,2	378,0	578,8
Including per one farm household	231,3	373,7	482,6	439,0	719,9
Small	164,9	242,8	458,2	412,9	573,6
Including per one farm household	4,1	6,1	11,5	10,4	18,3

There was an increase in funding of state support for farm households by 2.6 times during 2010-2014, mainly due to the VAT reimbursement by 3.2 times. At the same time, state allocations reduced by 2.7 times. It should be noted that per one farm household, the largest recipients of state support were medium and large farms, mainly due to VAT refunds.

The mechanism of VAT collection has undergone some changes in agriculture since 2015. This happened as a result of the adoption of the Law of Ukraine "On Amendments to the Tax Code of Ukraine and Certain Legislative Acts of Ukraine. Regarding Tax Reform" (№ 71-VIII of 28.12.2014), as well as legislative acts in the field of taxation.

In 2016, the process of further changes to the system of taxation of agricultural activity was observed, based on the Law of Ukraine "On Amendments to the Tax Code of Ukraine and Some Other Legislative Acts of Ukraine on Provision of Balance of Budget Revenues in 2016" No. 909 of December 24, 2015, without the introduction of any compensatory measures in terms of budget support for agricultural development. This situation is unacceptable for a number of reasons.

In the process of adopting a compromise solution on the use of special VAT regime in agriculture, the Ministry of Finance of Ukraine has chosen the worst

possible option – partial preservation of special VAT regime for all types of agricultural activity [4].

On the basis of the developed Law of Ukraine "On Amendments to the Tax Code of Ukraine and Some Other Legislative Acts of Ukraine on Provision of Balance of Budget Revenues in 2016" partial preservation of a special regime of VAT under the scheme of 25/75 was envisaged for 2016. In particular, the new law provided for the centralization of 10% of the amount of VAT accumulation with further distribution within the framework of targeted budget support programs.

In practice, only large agricultural enterprises and corn traders benefited from the realization of the scheme proposed by the Ministry of Finance of Ukraine in 2016. All other participants in economic relations in agriculture, including the State, lost. VAT support in relation to net revenues from the sale of export-oriented crop production was about 10%. At the same time, as a result of the restoration of VAT refunds when exported, the price of such products increased by at least 12-15%. Consequently, the producers of export-oriented crop production even gained from such legislative changes.

For agricultural enterprises, in particular farm households engaged mainly in the production of export-oriented types of crop growing, the Ministry of Finance left an additional 25% of the amount of VAT accrual. As a result, the estimated total income of such enterprises of the corporate sector of the agrarian economy from the partial abolition of the special regime and the restoration of export refunds increased by 7-8% compared to 2016 and 2015, respectively.

A completely different situation is observed in the farm households of the corporate sector of the agrarian economy, which specialize in the production of non-export oriented agricultural products. For such households, VAT support decreased fourfold: from 10.2% in 2015 in relation to net revenues to 2.6% in 2016.

There is a particularly threatening situation with livestock breeding, which will undergo a double blow. On the one hand, this will happen due to the increase in feed prices owing to an increase in the price of grain after the restoration of VAT refunds at export. On the other hand, many livestock enterprises will become unprofitable due to the loss of the bulk of VAT support that ensured cost-effectiveness of such enterprises in 2014-2015 [5].

In assessing the role of the special tax regime for the farmers, it should be noted that in recent years more than 95% of the total amount of state support to the industry was provided. Consequently, the competitiveness of agricultural products in the domestic and world markets increased significantly and a stable financial position of agricultural enterprises was ensured.

The use of indirect state financial support through the application of special tax regimes does not contradict the rules of the World Trade Organization, while

Ukraine is limited in the volume of direct budget support. At the same time, the ratio of the allowable limit of direct budget support to the amount of VAT support in 2013 was 26%, in 2014 – 16%, and in 2015 it did not exceed 11%.

The timely change in taxation of agricultural enterprises negatively affected investment activity, which would result in a reduction in agricultural activity and gross value added in the industry in the near future.

The abolition of the special tax regime will be a significant obstacle to the successful European integration of Ukraine's agriculture into the European economic space as a result of the reduction of competitiveness in connection with the entry into force on January 1, 2016 of the economic part of the Association Agreement between Ukraine and the European Union. This support is especially important in the first year of this Agreement [6].

The action of special VAT regime contributed to ensuring the investment attractiveness of the agrarian sector, increasing the level of financial investments in the development of agro-industrial production, which positively affected its volumes, especially had a good impact on crop growing, as well as increased the creditworthiness of the industry.

The experts note that, although, a special regime of VAT accumulation is more effective compared to many direct budget support programs due to its affordability and low administrative costs, nonetheless has a number of shortcomings.

First of all, almost two-thirds of the amount of VAT accumulation is generated by those types of agricultural products that do not actually require budget support because of the high cost-effectiveness of their production.

The second major drawback is the pro-cyclicality of support. That is, with increasing production volumes and profitability, VAT accumulation increases, while less cost-effective or loss-making activities require more budget support.

The special VAT regime somewhat restrained the investment activity of business entities, which planned to make significant investments. After all, in this case they will not be able to take advantage of the VAT accumulation. This special VAT regime hampered the development of agricultural cooperation, since cooperatives had been placed in unequal tax conditions with agricultural enterprises.

In addition, the special VAT regime negatively affects the level of prices for export-oriented crops, because the reimbursement of VAT is not made, as there is no appropriate source of funds.

In 2017, instead of a special VAT regime, a budget subsidy was introduced, which was aimed exclusively at supporting livestock producers. Despite the restrictions introduced by the budget subsidy allocation for the development of agricultural commodity producers and stimulation of agricultural production in 2017, approved by the Resolution of the Cabinet of Ministers of Ukraine of

August 02, 2017, No. 83, for poultry enterprises in the amount of 50%, their actual share in the total amount of paid grants amounted to 51,7%.

Moreover, the enterprises of two super-power groups of poultry companies received 44.5% of the total amount of subsidies – almost 1.8 billion UAH. The share of above-mentioned companies in the total amount of subsidies amounted to 85.8%.

All enterprises included in the top 5 largest recipients of budget subsidies represent the poultry industry.

The largest amount of subsidies received by only one poultry farm amounted to UAH 583 million, which is 14.7% of the total paid subsidies under the support program. In total, the five largest recipients of this form of support were able to receive 1,648.8 million UAH of budget subsidies, representing 41.3% of total support for the sector.

An important factor in state support for farm households is the introduction of a simplified tax system in the form of a fixed agricultural tax, which was subsequently transformed into a single tax for payers of the fourth group. But in recent years, this tax lost its unconditional attractiveness to agricultural enterprises: the single tax rates significantly increased, the list of taxes and charges from which the single taxpayers were released was reduced. As a result of these changes, the tax burden on the taxpayers of increased significantly.

We have analyzed the norms of the Tax Code of Ukraine, which are available to enterprises of the corporate sector of the agrarian economy for legal entities. Among them: the general system; simplified system of taxation for single taxpayers of the third group, simplified system of taxation for single taxpayers of the fourth group.

According to the results of the research, the fourth group of single taxpayers is more profitable for highly profitable farm households of the corporate sector of the agrarian economy, since the amount of the single tax depends on the area of agricultural land and its normative monetary valuation and does not depend on the results of the activity. The third group of single taxpayers is also suitable for highly profitable enterprises. When choosing a single tax (rate of 3% or 5%), it is also necessary to take into account the rate of profitability, after all it is better to pay at the rate of 5% and not to be registered as VAT payer for single taxpayers. In such a case, the entity should not have VAT payer status.

To be a single taxpayer with the registration as VAT payer (tax rate of 3%) is profitable for highly lucrative farm households of the corporate sector of the agrarian economy, which, under the terms of working with contractors, must be a VAT payer.

The general taxation system is profitable for low-gain (less than 15%) or loss-making agricultural enterprises, but it may be disadvantageous for economic

entities that own large areas of agricultural land, since they will have to bear additional costs of paying the land tax which the single taxpayers of the third and fourth groups do not pay.

So now, choice of the optimal tax burden depends directly on the management of the farm household. It should be noted that in recent years, the single tax of the fourth group of taxpayers (formerly a fixed agricultural tax) was the most effective method of state support for farms.

In accordance with Article 10 of the Law of Ukraine of 19.06.2003 № 973 "On Farm Enterprises", assistance to farm households is carried out through the State Farmers Support Fund of Ukraine, which is a state budget institution and performs functions for the implementation of the state policy on financial support for the establishment and development of farms.

Financial support is provided in accordance with the Procedure for the use of funds budgeted to support farm households, approved by the Cabinet of Ministers of Ukraine from August 25, 2004, No. 1102 (as amended).

We can observe the dynamics of farm households financing on a repayable basis during the period 2013-2017 (Figure 1).

Under the state program of granting loans to farm households, less than 50% of applications were executed. The needs of the farmers of Luganska and Donetska regions are completely satisfied. The preference was given to those farm households with up to 500 hectares of land cultivated; which are members of cooperatives or are engaged in breeding cattle, berry, viticulture or organic production, and whose activities show the dynamics of development. It is important that for the first time the family farm will get the financial support.

Figure 1 **Dynamics of Ukrainian farm households financing on a repayable basis at the expense of the state budget**
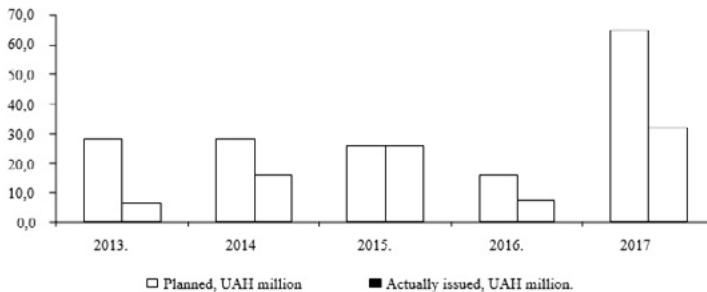
There was planned to allocate, mln. hrn
There was actually allocated, mln. hrn

The total amount of appropriations determined by the program for 2017 was UAH 65 million, which was 4 times more than in the previous year (2016 – 15.7 mln. hrn.), of which: UAH 25 million – at the expense of the general fund, UAH 40 million at the expense of the special fund.

Also, in Ukraine, for several years now, the assistance has been provided to the small agricultural producers in the framework of 15 projects for a total of US$ 83 million. In particular, these are projects for the development of greenhouse farming and gardening in the South of Ukraine. There are also projects to support co-operation and irrigation in the central and western regions [7]. As far as support for plant growing and organic farming is concerned, the competent ministry recognizes the importance of making a decision on the financing for the provision of assistance to farmers for the development of these areas. It is also noted in the ministry that this necessary support will be given to the farmers in the near future – as soon as the Strategy for Agriculture and Rural Development for the period until 2020 will be implemented in practice.

In 2017, the Cabinet of Ministers of Ukraine adopted the Resolution "On Approval of the Concept of Development of Farmers and Agricultural Cooperatives for 2018-2020". It forms the organizational, legal and financial background for the development of farm households and agricultural cooperatives, improving the financial situation of the rural population.

The introduction of systemic support of the farmer will allow to double the production of gross agricultural output in three years and to develop the processing of raw materials within the country. This will ensure the growth of foreign exchange earnings from agrarian exports and increase marginality for economic entities.

The State budget for 2018 has earmarked UAN 1 billion for the support of farm households. According to the budget program of support for the development of farms, the following support is offered in 2018: payment of subsidies – to farm households that are registered in the established order after January 1, 2018 and have tillage land area up to 20 hectares – in the amount of 30 th hrn. Primary right is granted to farm households, whose founders are persons under the age of 35 (inclusive); support of agricultural cooperatives by reducing the cost of purchase of machinery and equipment (70%); cheapening of loans received from a state bank or a bank in which 75% and more of the shares belong to the state in authorized capital; compensation of the cost of purchased seeds and seedlings of agricultural plants of Ukrainian selection such as: superquality stock seeds, stock seeds, first generation seeds, parental seeds and F1 hybrid seeds.

The program also includes providing preferential loans, the cost of agricultural machinery and equipment will be partially offset. Besides the program provides financial support for livestock production, horticulture, viticulture and

agricultural processing, offers cheaper agricultural loans and insurance, support for beginners. It is planned to hold special land auctions for the right to lease land for horticulture, viticulture, hop cultivation and organic farming.

The concept will stimulate the farm households to obtain farmer's status and the unification of farmers in cooperatives.

According to scientists, as a result of the implementation of the Concept, it is expected to increase the share of farm households in production of gross agricultural products to 12%, the growth in the number of jobs in five times (from one hundred to a half million), technical re-equipment of farmers. Also it is planned to expand the area under organic crops to 10% during this period.

4   Conclusions

On the basis of the conducted analysis it was determined that the main reasons for low effectiveness of farm households are the lack of a coherent and consistent state policy aimed at supporting farm households having land in cultivation, ownership and use with a total area of no more than 100 ha; low level of opportunities for attracting financial resources and investments for the functioning and development of farms; impossibility to attract land resources for mortgage lending.

Stimulation of the development of farming and service cooperatives is an extremely important task that will give effect in many respects. Since new jobs in the countryside will bring taxes to the local budgets, the development of rural areas, and the slowdown of urbanization, the reduction of the Ukrainian village extinction rate. Such economic results, supplemented by the solution of other problems which farm households face nowadays, will allow to be better prepared for the opening of the land market in the future.

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COMPETITIVENESS OF UKRAINIAN GRAINS AND OILSEEDS IN TERMS OF DIVERSIFICATION OF EXPORT

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Abstract

In recent years, Ukraine has continuously increased production volumes and has become a leader in exports of grains and sunflower oil. However, to form a balanced agrarian policy, it is important to ensure the competitiveness of products in the internal and external segments of the agro-food market. The article generalizes the nature and importance of competitiveness for the sustainable economic development of the country. The commodity and geographic structure of export of agro-food products of Ukraine was analyzed and main tendencies of its development were analyzed. The competitiveness of agro-food products was calculated according to Balass method, where the indices RXA-indices of relative export competitiveness and RCA-index of the revealed comparative advantage were determined. Based on the research conducted in the article, the relevant conclusions are drawn.

Keywords: *competitiveness, grains and oilseeds, agricultural policy, domestic support*

JEL Classification: *F16, F18, Q17, Q11*

1   Introduction

The current stage of functioning and development of the national agro-food market is connected with its restructuring in the direction of increasing competitiveness, as it is required not only by the influences of world markets, but also by factors of globalization, Ukrainian entrance to the WTO and an agreement on FTA between Ukraine and the EU. These challenges must be accompanied by qualitatively new steps to create conditions for the market liberalization of agro-food products.

Ukrainian agribusiness faced the task of solving an extremely important problem, which is related to the choice and implementation of effective ways of development in the new geopolitical conditions, when the effects of globalization and the development of the knowledge of economy and innovation in the world dimension become more and more tangible.

Under these conditions, the key to the development of the agro-food market is to provide competitive products, to create favorable conditions for entrepreneurship development, and to reduce the state's interference in the economic activity of agricultural sector entities.

The development of the agriculture sector objectively requires the creation or modernization of competitive mechanisms, the development of scientifically sound and effective (in terms of practical implementation) of the institutional principles of protection and development of competitive relations in the market, increasing the competitiveness of products in the domestic and foreign markets [1].

The aim of the article is the evaluation of the grain and oilseed competitiveness of Ukraine at the foreign segments of agriculture market and development of determinants of its increase due to diversification of domestic exports on the basis of the implementation of competitive advantages on world markets in the short and medium term periods.

2   Data and Methods

The given research is based on the general scientific methodology. During the process of research there were used a system analysis and synthesis, monographic, abstract, logical, economically mathematic, grouping, computational and balance methods of scientific researches.

The determination of the level of competitiveness of agro-food products in selected segments of the world market, empirical methods for evaluating the comparative advantage indices RCA (Relative Comparative Advantage Index) and RXA (Relative Export Advantage Index) based on the classical index of V.Balassa have been used.

The RCA's relative comparative advantage index and the RXA's relative export competitiveness index essentially describe one process, and can be determined by formula 1:

$$RCA = RXA = \frac{X_{ij}/\sum_n X_{nj}}{\sum_k X_{ik}/\sum_k X_{nk}}$$ (1)

provided that $n \neq i$, $k \neq j$, this restriction distinguishes index from RCA; where X - export, i - country, j - commodity, n - aggregate countries, k - aggregate of goods. The index value is within range $[0;+\infty]$.

The area in which the country exports specialized products is characterized by a value of 1, and values between 0 and 1 indicate a lack of benefits.

The RXA index is defined as the ratio of the country's share in the global export of a given product to the share of that country in the world export of all other goods. A specific feature of this meter is that world exports of goods are always defined as the sum of exports of all countries, except that which is being investigated. The value of the RXA index is interpreted as follows. If it is greater than 1, the country has comparative advantages in terms of exports of the product under consideration, but if RXA <1, then this indicates a competitive disadvantage.

For calculations used official data of the State Statistics Service of Ukraine, Eurostat, information agency UkragroConsult.

3 Results and Discussion

The competitiveness of the agriculture sector of the economy is a rather complex and multifaceted category, which is determined by various factors.

Competitiveness is one of the main categories widely used in the theory and practice of economics, a multifaceted nation that in Latin translation means rivalry, the struggle for achieving the best results [8].

Definition of the concept of "competitiveness" is disclosed in the writings of such foreign researchers: J. Lamben, M. Porter, F. Kotler and others. Aspects of providing and assessing the level of competitiveness are the subject of research by domestic scientists, such as: Y.Zhalilo, B. Kvasnyuk, S.Kvasha, A. Kredisov et al. However, at the moment, the essence of competitiveness is interpreted by experts in different ways.

The basis of understanding the essence of the notion of enterprise competitiveness is the study of M. Porter, who unveiled a theory of competitive advantage, according to which the competitiveness of the enterprise can be estimated within the group of enterprises belonging to the same industry [9].

According to A. Kredisov, competitiveness is a characteristic of a product that reflects its difference from a similar competitive product, both by the degree of compliance with a specific need and by the cost of its satisfaction [10].

Kvasha S.M. (2006) believes that competitiveness is determined by the price, quality and liquidity of agro-food products [7].

Competitiveness is a complex category, its benefits are finally realized through trade, but the basis of competitive advantage is created at all levels of social production, including to a large extent due to structural adjustment and effective industrial policy.

The theory of competition proceeds from the fact that rival not the country, but individual producers or sellers of products. However, the economic success of

the state, that is, its competitiveness, is directly determined by the presence of its competitive industries and industries. Therefore, increasing the competitiveness of national commodity producers has articles of the most important priority of the agriculture policy of Ukraine.

In recent years, Ukraine has substantially increased its production and export volumes. According to Fig.1 in Ukraine, grain production grew by 20 million tons, or almost 43% mainly due to corn. A significant increase in grain production was primarily due to the introduction of modern cultivation technologies in large agroholdings, which mainly grow those grains that are in demand on the external markets - corn, wheat, barley. Today's Ukrainian grain market is a highly competitive environment, where international companies are represented, which specialize both in the production and export of grain.

According to the 2016/17 MP, domestic grain consumption in Ukraine was 24.2 million tons, or 42% of their total production. It should be noted that the volume of domestic consumption is systematically reduced (an average of 3% annually), which is due to the reduction of population and the decrease in domestic demand for food products for processing grain. There is also a decrease in livestock, which resulted in a decrease in feed consumption, accounting for almost 60% of the total grain consumption in the domestic market.

Figure 1 **Grain balance in Ukraine, mln. tones**
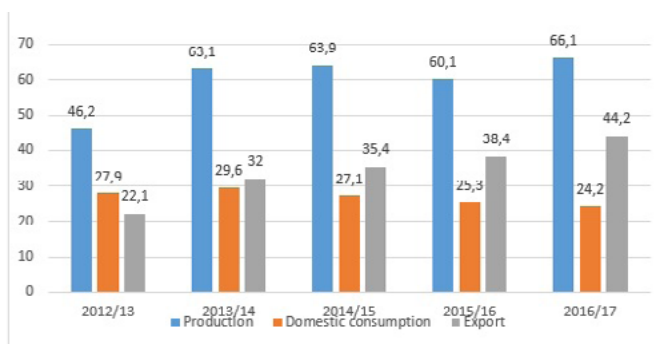
Source: Based on the data of the State Statistics Service.

Moreover, negative trends in domestic consumption led to the annual achievement of record-breaking rates of Ukrainian grain exports. The season ended was no exception, and on its results for export was put a record 44.2 million tons of grain. In general, for 5 seasons, the average increase in export supplies was 20% annually [12].

It should be noted that the potential of the main grain crops in Ukraine is realized only by 50-60%.

In the dynamics of Ukrainian corn export, in accordance with the growth rate of production, there is a general upward trend. It is expected that following results of the current season, the record volume of 21.3 million tons will be delivered to foreign markets, which is 28% more than the previous season. It should be noted that such export rates became quite unexpected, as against the backdrop of rainy weather during the harvesting period significant losses of yield and deterioration of its quality were expected [12].

Export became possible by the growth of supplies to traditional markets, and by the development of new ones. Thus, the key importer of Ukrainian corn - Egypt - has increased the volume of purchases in October-July 2016/17 MR by 56% compared to the same indicator in the previous season. Supplies to the Netherlands increased by 87%.

However, it should be mentioned a more substantial increase in exports to Iran, where in the reporting period was delivered almost 2.2 million tons of Ukrainian corn, which is 3.2 times more than in the previous season. Also, the supply to South Korea increased by 7.1 times. As for key importers such as Spain and China, imports are down 11% and 37% respectively. In general, it can be noted that, despite all expectations, China remains a situational buyer of Ukrainian corn, and in the future this direction will not remain a priority [12].

The analysis of the dynamics of corn imports by key partner countries of Ukraine shows that the three markets that are traditional for Ukraine in the EU, Egypt, and Iran are promising in grain purchases. Thus, according to forecasts of USDA analysts, in 2017/18 MP, against the backdrop of adverse weather conditions and declining dynamics of domestic production, imports of the European Union could substantially increase, deliveries to which countries are estimated at 16.0 million tons or + 19% to the previous indicator season (13.4 million tons).

Figure 2 **World price for corn, 2010-2017**
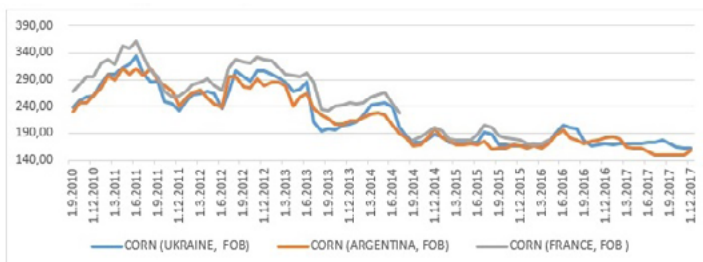
Source: Based on the data of UkrAgroConsult.

From the graph, it is clearly demonstrated that prices for food type of wheat far outweigh the feed wheat, since different classes. However, it should be noted that over the past 5 years, the trend of wheat prices has fallen from $ 350 to 190 (Fig.3).

Figure 3 **Ukrainian wheat price, 2010-2016**
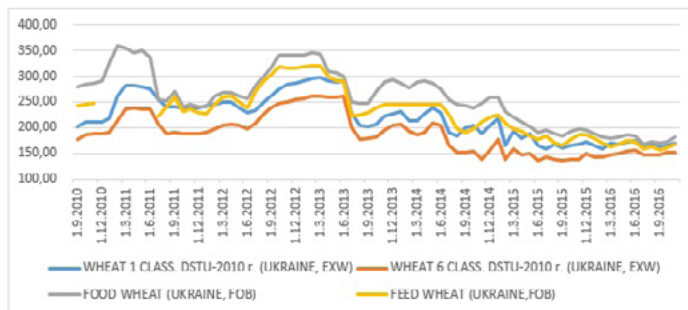
Source: Based on the data of UkrAgroConsult.

Analyzing world prices from different countries, it can be noted that FOB price of is competitive compared with other wheat exporters. Exports of barley from Ukraine in 2016/17 MY also took place at a record pace, but the dynamics remained traditional - with peak supply in July-September. During the specified period of the season, 3.2 million tons of barley were exported, accounting for 59% of total exports in the season and 9% more than exports for the same period of the previous MY.

Figure 4 **Price difference in food wheat, 2010-2016**
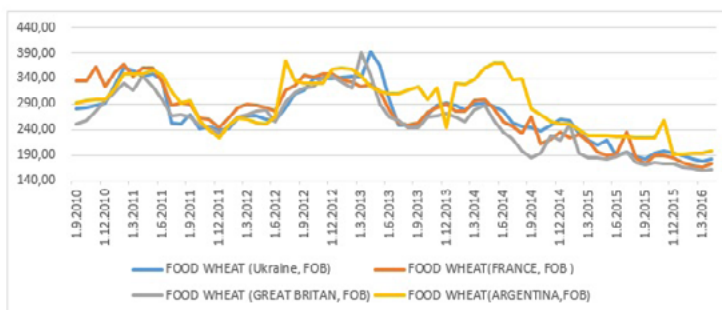
Source: Based on the data of UkrAgroConsult.

In the context of the globalization of the world economy, the development of foreign economic relations and trade is an extremely important factor in the

functioning of the national economy of any state, since it has not only economic but also enormous political significance. After all, the challenges associated with the globalization of the agro-food system lead to accelerated growth of world food trade, compared to the growth rate of agricultural production and food production.

We believe that the important issues in the process of Ukraine's integration into the world economic community are the saturation of its domestic market with competitive agricultural products and expansion of its exports. Along with this, the priority direction of the strategic development of Ukraine's food sector at the stage of forming the relations with the world market should be considered not only growth of its export opportunities, but also improvement of the structure of exports, and the main thing - the emergence of new markets with competitive agriculture products, which would meet the requirements of international standards.

It is believed that the competitiveness of domestic agriculture products consists of a combination of competitive advantages that are manifested in the world market by comparing them with the relevant factors of other competitors. The study of different opinions and interpretations of economists about the indicators that shape the competitive advantages of a particular country in the production of one or another type of food or agricultural production, suggests that the most relevant approach to addressing the above problem is the analysis of the export and import of agriculture and food products. Consequently, the larger the country's exports of a particular product, the more competitive it has.

By comprehensively evaluating the competitiveness of the agro-food sector in comparison with other branches of the Ukrainian economy, we consider to use the methodology for calculating the index of the identified comparative advantage of RCAi, using statistical information on the volumes of foreign trade of the country by separate groups of goods. The above-mentioned concept considers the state of competition of a separate sector in comparison with other sectors of the country's economy, and the indicator includes export and import volumes. The RCAi Index (Revealed Comparative Advantage), that is, the index of the identified comparative advantage, unifies the export and import of the same industry with the total export and import of all branches of a particular country:

$$RCAi = \frac{Xi - Mi}{Xi + Mi} - \frac{\sum(Xi - Mi)}{\sum(Xi + Mi)} \tag{2}$$

where   RCAi – the index of the revealed comparative advantage of the same industry; Xi – cost of export of products of the same industry; Mi – the cost of import of products in the industry.

The positive value of this index means that the industry has a comparative advantage. If the i-th industry is a net exporter, then it exports more than the totality of all industries. The negative index value represents a comparative loss.

Dynamics of comparative advantages of Ukraine in foreign trade in separate groups of goods in 2012-2016 is presented in Fig. 5.

According to the data in Fig. 5, it can be concluded that the worst position is the Living Animals; products of animal origin, as the dynamics shows from 2012-2014, the index falls below zero, which indicates the lack of competitiveness of the industry, but in 2015, the index turned out to be positive dynamics, and became more than in 2012.

Figure 5 **Dynamics of comparative advantages of Ukraine in foreign trade by separate groups of agro-food products in 2012-2016**

	2012	2013	2014	2015	2016
▪ Living animals; products of animal origin	-0,18	-0,17	-0,05	0,19	0,10
▪ Products of crop origin	0,686	0,635	0,628	0,741	0,720
▪ Fats and oils of animal or vegetable origin	0,927	0,891	0,859	0,887	0,877
▪ Food products	0,185	0,147	0,092	0,203	0,165
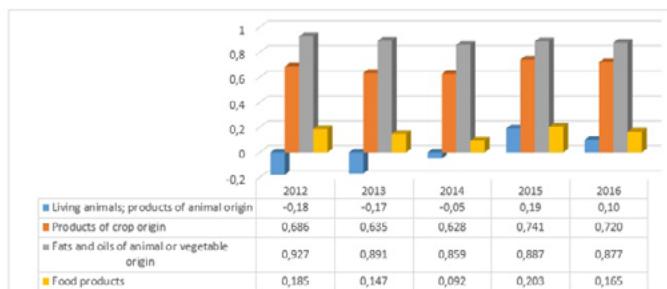
Source: Author own calculation [13].

However, the best position is occupied by the field "Fats and oils of animal or vegetable origin". Its dynamics can be called relatively stable and the most competitive branch among other agro-industrial products. According to the calculations, it is possible to report that Ukraine is an effective exporter of soybean oil and takes the 1st place in the export of this culture [11].

In addition to assessing the comparative advantages of domestic agro-food production in general, we also conducted a study of individual food products in Ukraine for 2014-2016. For analysis, the goods that currently form the basis of Ukrainian agro-food exports were selected.

At the same time for the research the method of calculating the indices of the relative export preferences of RXAij for selected agricultural commodities, which are the main products of export specialization of Ukraine, was selected. The chosen period of 2013-2015 allows us to follow the dynamics of changes in the competitiveness of individual goods over time. In calculating the index of relative export preferences, RXAij simultaneously take export performance of

a particular product from the country under study, world exports of this product, and all exports of this country as a whole, as evidenced by the formula 2 [12]:

$$RXA = \left(\frac{X_{ij}}{\sum_{l,l\neq j} X_{ij}}\right) / \left(\sum_{k,k\neq i} X_{kj} / \sum k, \, k \neq i \sum_{l,l\neq j} X_{kl}\right) \tag{2}$$

Indicators of the analysis of the comparative comparative advantages of the countries of the world by separate product groups (based on calculations of the indices of relative export preferences RXAij). Firstly, as can be seen from Table 1, from 2014 to 2016, the largest importer of wheat was Egypt, which imported nearly 2 billion dollars. and has an index of 6.26-6.66-1.68 which means that domestic wheat is competitive when exported to Egypt.

Table 1 **Index of Relative Export Benefits (RXAij) of Ukraine's main grain crops in the major segments of the world market**

Countries	2014	2015	2016
Wheat			
India	-	-	2,01
Spain	26,49	15,32	-
Italy	107,89	19,29	-
Bangladesh	-	-	11,66
Egypt	5,24	6,66	1,68
Indonesia	-	13,12	10,42
South korea	36,35	13,23	9,23
Marocco	30,07	-	-
Pakistan	31,30	-	-
Thailand	-	-	9,23
Tunis	-	19,54	-
Corn			
Spain	14,01	12,47	4,83
Egypt	17,16	12,02	2,14
Iran	-	-	6,88
Italy	-	-	2,52
China	20,43	9,88	2,65
South Korea	29,74	35,80	-
Libya	-	17,89	-

Countries	2014	2015	2016
Netherlands	22,65	19,29	4,88
Tunis	6,32	-	-
Barley			
Iran	14,53	-	-
Spain	-	27,05	-
Italy	48,22	-	-
Algeria	49,92	28,00	27,39
Greece	-	67,85	-
Jordan	-	-	44,88
China	-	41,22	3,54
Libya	19,18	70,96	26,17
Saudi Arabia	12,83	13,89	10,94
Tunis	-	-	27,50

Source: Calculated on the author data [13].

In 2014, due to the change of course and diversification of domestic exports, and the signing of the same FTA with the EU in the same year, which gave impetus to the opening of new markets, and already in the period 2014-2015 2nd and the corresponding third place was already occupied by South Korea and Spain with corresponding idocs in 2014-2015 years (36.35-13.23 and 26.49-15.32).

In 2016, India became the largest importer of wheat, and where wheat became competitive in the Indian market at 2.01. Also, the country of Bangladesh and Thailand, which took 3rd and 4th place respectively, became the opening.

Secondly, the corn market in the studied years of 2014-2016 also undergone significant changes in the geographical export of this culture as evidenced by the figures given in the table. According to the data, it can be noted that in 2014, countries such as Egypt, Spain, and China and Korea became the most competitive ones as evidenced by their indices. However, in the period from 2015-2016, it can be noted that Egypt and Spain remained importers of domestic maize, but Iran and the Netherlands joined them.

Thirdly, looking at the data given on barley, it can be noted that in the period from 2014 to 2016, the world's largest importer is Saudi Arabia. It became number 1 in the investigated period for the import of domestic barley, and the competitiveness index was constantly at a sufficient level to be considered a competitive culture.

In 2014, Libya and Iran became two other countries where the competitiveness of barley in these markets was high enough. In spite of the diversification of domestic exports in 2014-2016, Saudi Arabia remains the number one number by product, but, speaking of the indices, the countries with the largest competitive market for domestic barley were Libya, Algeria and China. It should be noted that in 2016 the Ukrainian barley market has become more diversified, and it has been exported to large scale to the following countries: Jordan and Tunisia.

The main problems of exporting Ukrainian grain are significant costs and the length of internal transshipment and grain transportation. Due to the mismatch of logistics routes with the current requirements of agrarian exports, the current costs of moving grain from linear elevators to the Black Sea ports are about 40% higher than similar costs in France or Germany, and 30% of the same costs in the United States (agrarian logistics). That is, transportation of grain costs them an average of 20 dollars / t more than the same services in European countries. As a result, domestic grain producers lose about $ 600 million annually [14].

In general, high logistic costs in Ukraine are due to the rather low efficiency of logistics, which is confirmed by estimates of international experts (agrarian logistics). So, for the comparative logistics performance of the world, measured in 2016 by the World Bank's Integrated Index of Logistics Performance Index (LPI), Ukraine is only at the 80th place and one third is inferior to Germany, which is the leader in this ranking. Until today, the problem with logistics was less felt by grain traders, as the volumes of grain exports were significantly lower, and high world prices for grain were offset by excessive logistics costs.

4   Conclusion

On the basis of the analysis, it is concluded that, despite the leading place in Ukraine on the world market among producers of certain types of agricultural products, not all commodity groups are competitive. In particular, the competitiveness of products of animal origin is extremely low.

The obtained results of the RCA and RXA indices for grain and oilseeds on the external segment of the world market are in the range of more than 1. This is confirmed by the high level of competitive advantages of grain and oilseed crops in Ukraine. However, the analysis conducted showed that the competitiveness of domestic grain is provided, for example, mainly by the price segment, but not by the quality.

The geographic structure of Ukrainian agriculture exports remains unchanged over the past three years. About 97% of the value of exports comes in four main regions - the countries of the European Union, Asia, Africa and the CIS. In spite

of the signing of the FTA with the EU, the share of Ukrainian agricultural exports in 2016 amounted to 27.1%, which is almost twice as much as the Asian countries. Competitive development of the agricultre sector requires a full-fledged transition to an innovative type of economy geared towards supporting high-tech ecological and socially oriented agricultural production. At the same time, strategic priorities are not only the modernization of production technologies, but also the improvement of its sectoral structure, forms of organization and management methods.

In general, grain system infrastructure, which is the required element of grain market functionality, is needed in modernization of new and old facilities. Consequently, is should be qualified investments policy and support from the government and private sector.

Improving the efficiency of logistics infrastructure is becoming increasingly important for Ukrainian grain producers and their competitiveness on the world market, export deliveries. Introducing innovations in logistics will stimulate the future growth of grain exports from Ukraine. In addition, the development of grain logistics infrastructure provides job creation, added value of products, which contributes to increasing revenues in the state and local budgets. Consequently, the reform of state regulation should be comprehensive and aimed at the maximum possible elimination of barriers for private companies operating in the market of agrarian logistics and willing to invest in infrastructure updates (agrarian logistics).

The state should focus on the problematic aspects of infrastructure development. This will enable the optimal use of transport potential of Ukraine and provide the most favorable conditions for transportation for domestic exporters of grain. Consequently, it will help maintain the level of grain exports and increase the volume of Ukrainian grain on the world market.

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BOVINE BUTTER ENRICHED WITH SESAME OIL: SAFETY INDICES AND TECHNOLOGY

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Abstract

The purpose of the study is to determine the fatty acid composition of vegetable oils (sesame, linseed, pumpkin seed) and their safety indices (toxic elements, pesticides, mycotoxins). Such vegetable oils as sesame oil, linseed oil and pumpkin seed oil have been studied in terms of fatty acid composition and safety indices to identify their useful properties. Sweet cream unsalted butter with a mass fat content 72,5%, as well as bovine butter with sesame oil have been examined according to organoleptic, physico-chemical and safety indices. The sesame oil has been added to butter to increase its biological value due to the enrichment of polyunsaturated fatty acids. The production technology of butter "Na Zdorov'e"("To your health") by enriching butter in polyunsaturated fatty acids containing in sesame oil in sufficient quantities is developed. This technology ensures the improvement of the positive properties of the new product. The studies prove that sweet cream unsalted butter with a mass fat content 72.5% and the produced butter butter "Na Zdorov'e" possess the fatty acid composition and safety indices which do not exceed the acceptable levels of Technical regulations of the customs Union "On safety of food products" (CU TR 021/2011). STO 00430522-001-2016" Bovine butter with flavouring component" has been worked out.

Keywords: *butter, fatty acid composition, safety, safety indices, vegetable oils*

JEL Classification: *Q16, Q17*

1   Introduction

Butter is the product rich in calories which are provided with milk fat. Vitamins A, D, E, provitamin A, water-soluble vitamins B1, B2, C, PP, phosphatides-lecithin provide biological value of the butter [1, 2, 4, 17]. Bovine butter contains such minerals as sodium, potassium, magnesium, calcium. Other components include cholesterol and low molecular weight fatty acids (oleic, caproic), providing a peculiar taste. [3, 17]. Butter has a low content of polyunsaturated fatty acids such as linoleic and linolenoic which are also found in vegetable oils in sufficient quantity. Sesame oil is produced by pressing the whole sesame seeds which contain 48-58% of fat and are covered by smooth skin [17]. Seeds might be both of light and dark colour, the seeds of light color possessing the greatest value for getting sesame oil. They are used to obtain the sesame oil of better quality [17]. The important characteristics of sesame oil are pleasant delicate flavour and taste [17]. Refined sesame oil is used both in culinary art and canning, as well as in margarine production [17]. Leenseed oil is produced by pressing leenseeds or by method of extraction [17]. It has peculiar flavour, and its colour might rage from light yellow to brown with green tone [17]. Fatty acids, like oleic, linoleic, linolenoic can increase nutritious value of milk fat [17]. Alongside with other vegetable oils which are rich in oleic and linoleic acids, sesame oil contains 35-40% of them, pumpkin seed oil has 26-81% of the acids whereas there is 20% of linolenoic acid in the linseed oil. [17].

Taking everything mentioned above into consideration, it is essential to develop the technology of butter production by adding vegetable oils rich in polyunsaturated fatty acids. The purpose of this study is to develop production technology and to assess the safety performance of butter "Na Zdorov'e".

2   Data and Methods

The study of sesame oil , linseed oil, pumpkin seed oil, sweet cream unsalted butter and butter "Na Zdorov'e"was conducted by determining the fatty acid composition and potentially hazardous substances such as toxic elements, pesticides, mycotoxins, using standard research methods and modern instruments in triple replications. Detection of fatty acid composition of vegetable oils was performed by gas chromatography (GC). The method is based on the transformation of triglycerides of fatty acids into methyl (ethyl) esters of fatty acids and GC analysis of the latter [14]. The determination of fatty acid composition of butter was also performed by gas chromatography. The method is based on the use of a gas chromatograph using a packed column or a capillary column to determine the qualitative and quantitative composition of a mixture of fatty acids in the form of methyl esters [15]. Stripping voltammetric

method is used to find cadmium and lead in vegetable oils [9]. To determine copper in vegetable oils polarographic method is used. The method is based on dry mineralization (ashing) of a sample using nitric acid as an auxiliary means as well as quantitative detection of copper by means of polarography in the mode of AC current [13]. Stripping voltammetric method is used to find arsenic in vegetable oils [8]. To detect mercury in vegetable oils colorimetric method is used. Stripping voltammetric method is used to specify the amount of arsenic and mercury in bovine butter. Stripping voltammetric method is based on the dependence of the current passing through the cell analyzer with the tested solution on the mass fraction of the element contained in the solution and functionally associated with the shape and parameters applied to the electrodes polarizing voltage [5]. Stripping voltammetric method is also used to detect cadmium, lead and copper in bovine butter. The voltammetric analyzers AKV-07 MK were used for this purpose [6]. To detect iron in both vegetable oils and butter colorimetric method is used. The method is based on measuring the color strength of the solution of complex compounds of bivalent iron with ortofenantroline of red color [12]. Pesticides in vegetable oils were determined by gas-liquid chromatography [16]. The residual amounts of organochlorine pesticides were determined in butter by means of chromatography [10]. The method is based on the isolation of organochlorine pesticides from milk and dairy products, further purification of the extracts and detecting them on glass slides covered with a layer of adsorbent; chromatogram is distilled in the mobile solvent and the chromatogram is developed by silver nitrate. To determine the amount of mycotoxins (aflatoxins B1, M1) in vegetable oils and butter thin-layer chromatography method is used [7]. The method is based on extraction of aflatoxins B1 and M1 from the sample of the product,its further purification and measurement of mass concentrations using thin-layer chromatography while visually determining the amount of the substance in the spot. The study was carried out in the laboratories of the Russian State Agricultural University – Moscow Timiryazev agricultural Academy and in specialized research centers.

3   Results and discussion

When determining the fatty acid composition of vegetable oils such as sesame oil, linseed oil and pumpkin seed oil it was found out that the content of myristic, palmitoleic, heptadecanoic, behenic, lignoceric acids as well as the amount of fatty acids: lauric (sample 1), pentadecanoic (sample 4), CIS-heptadecanoic (samples 2,3,4), eicosandienoic (sample 4), eicosatrienoic (sample 4), arachidonic (sample 4), eicosapentanoic (sample 4), erucic (sample 4) was minimal [table 1].

The maximum content of palmitic acid is detected in the pumpkin seed oil, whereas the lowest is in linseed oil; the maximum amount of fatty acids such as

stearic, oleic, linoleic acids, are found in the sesame oil while linseed oil contains the minimum amount of these. The maximum content of linolenic acid found in sesame oil (sample 1) was equal to that in samples 2,3,4 of vegetable oils. The maximum amount of gamma-linolenic acid is contained in linseed oil and the minimum appear to be in the samples of sesame and pumpkin seed oil.

Fatty acids, in particularly arachidonic one, was found in sesame (Sample 1) and linseed (Sample 4) oils; gondoinic acid was only revealed in the sesame oil samples.

Thus, oleic and linoleic fatty acids existed in all kinds of vegetable oils, having the maximum proportion in the sesame oil samples. So, the decision was taken to use the sesame oil as an additive to the bovine butter.

On determining the safety indices in sesame oil, linseed oil and pumpkin seed oil it was found out that toxic elements (iron, cadmium, copper, arsenic, mercury, lead) existed in all samples,

Table 1 **The study results of changes of vegetable oils fatty acid composition**

Index	Sample 1 Sesame oil	Sample 2 Sesame oil	Sample 3 Sesame oil	Sample 4 Linseed oil	Sample 5 Pumpkin seed oil
C12:0 Lauric, %	< 0,1	-	-	-	-
C14:0 Myristic, %	< 0,1	< 0,1	< 0,1	< 0,1	-
C 15:0 Pentadecanoic, %	-	-	-	< 0,1	-
C16:0 Palmic, %	9,1	9,1	9,2	5,4	11,8
C 16:1 Palmitoleic, %	0,2	0,1	0,1	0,1	-
C17:0 Heptadecanoic, %	< 0,1	< 0,1	< 0,1	0,1	-
C 17:1 CIS-heptadecanoic, %	-	< 0,1	< 0,1	< 0,1	-
C18:0 Stearic, %	5,0	4,7	5,2	4,1	4,5
C18:1 Oleic, %	41,8	38,8	40,8	19,5	22,4
C18:2 Linoleic, %	42,3	45,1	42,4	17,4	32,1
C18:3 Linolenic, %	0,7	0,2	0,2	0,2	-
C18:3n6 Gamma-linolenic, %	-	0,6	0,6	52,5	-
C20:0 Arachidonic, %	0,5	-	-	0,2	-
C20:1 Gondoinic, %	0,2	0,3	0,3	-	-
C 20:2 Eicosandienoic, %	-	-	-	< 0,1	-
C 20:3n6 Eicosatrienoic, %	-	-	-	0,1	-
C 20:4n6 Arachidonic	-	-	-	< 0,1	-
C 20:5n3 Eicosapentanoic, %	-	-	-	< 0,1	-

Index	Sample 1 Sesame oil	Sample 2 Sesame oil	Sample 3 Sesame oil	Sample 4 Linseed oil	Sample 5 Pumpkin seed oil
C22:0 Behenic, %	0,1	0,1	0,1	0,1	-
C22:1 Erucic, %	-	-	-	< 0,1	-
C24:0 Lignoceric, %	< 0,1	0,1	0,1	0,1	-

but their amount does not exceed the acceptable levels [18] [Table2]. Toxic elements (lead, mercury, cadmium, arsenic) can accumulate in water, plants and atmosphere, and consequently, are given to the products processed from the plants, that is vegetable oil. The main sources of copper in vegetable oils are an industrial emissions, chemical crop protection agents. Contamination of vegetable oils with iron is likely to be due to their contact with metal equipment during the manufacturing. The residual quantity of pesticides and mycotoxins were detected in all samples of vegetable oil, but their contents did not exceed permissible levels [18], [table 2]. The penetration of pesticides into vegetable oils appears to be associated with the use of chemicals in agriculture to protect plants. The penetration of mycotoxins in vegetable oils may be caused by delayed harvesting of cultivated plants, the violation of technological modes of processing, storage, transportation, and marketing of oils.

Table 2 **The results of vegetable oils safety indices research**

Index	Allowable level	Sesame oil Sample 2	Sesame oil Sample 3	Linseed oil Sample 4	Pumpkin seed oil Sample 5
Toxic elements					
Iron, mg/kg	≤ 5,0	1,2	2,0	1,0	1,9
Cadmium, mg/kg	≤ 0,05	< 0,002	< 0,002	< 0,002	< 0,002
Copper, mg/kg	≤ 0,4	< 0,2	< 0,2	< 0,2	< 0,2
Arsenic, mg/kg	≤ 0,1	< 0,04	< 0,04	< 0,04	< 0,04
Mercury, mg/kg	≤ 0,03	< 0,004	< 0,004	< 0,004	< 0,004
Lead, mg/kg	≤ 0,1	< 0,02	< 0,02	< 0,02	< 0,02
Pesticides residues					
HCH (alpha-, beta-, gamma - isomers), mg/kg	≤ 0,2	< 0,001	< 0,001	< 0,001	< 0,001
DDT and its metabolites, mg/kg	≤ 0,2	< 0,001	< 0,001	< 0,001	< 0,001
Mycotoxins					
Aflatoxin B1, mg/kg	≤ 0,005	< 0,003	< 0,003	< 0,003	< 0,003

The technology to produce butter "Na zdorov'e" with sesame oil has been developed. The technological process includes the following operations: reception and preparation of raw materials; making and normalization of high-fat mixture; pasteurizing the mixture; mixture transformation; packaging and labelling.

Butter with sesame oil is produced by the method of converting high-fat cream. Milk, cream and sesame oil are taken according to weight and quality. Milk is separated. The mass fraction of fat in cream is 30-40%. Production of high-fat cream from the cream containing 30-40% fat mass fraction is carried out on the separator in strict accordance with the instructions for the production of sweet butter. The moisture content of high-fat cream is 25.5%, having 72.0% of fat mass fraction. High-fat cream is heated up to $(65\pm5)^0C$ constantly stirring and sesame oil is added. Normalized high-fat cream has the moisture content of 25.0% and fat mass fraction of 72.5%. Normalized mixture of high-fat cream is stirred for 15±5 minutes and, if necessary, is passed through a dispergator a centrifugal pump at the temperature of $(65\pm5)^0C$. Normalized mixture of high-fat cream is pasteurized directly in the baths for normalizing at the temperature of $(85\pm5)^0C$ and is held at this temperature for 3-5 minutes under constant stirring. Normalized pasteurized full-fat mixture is fed to a butter worker at the temperature of $(65\pm10)^0C$. The operating modes of a butter churn are set depending on its design. The temperature of butter is set at the level of $(15\pm2)^0C$ when leaving the butter churn. Butter is packed in a box which has been covered with parchment inside. The butter block should be fully covered with packaging material. Net weight of butter in the shipping container makes 20 kg. The product is stored at the temperature of minus $(16\pm2)^0C$ and 90% of relative humidity for no longer than 15 months. The shelf life of the product in the consumer packaging at the temperature of $(3\pm2)^0C$ and relative humidity of not more than 90% is 30 days. Packaging and labeling are carried out in accordance with the requirements of the Customs Union "Food products regarding its marking" (TR TS 022/2011) and the requirements of the Customs Union "On safety of packaging" (TR TS 005/2011).

Table 3 **Study of fatty-acid composition of sweet cream unsalted butter with mass fat content of 72, 5%**

Index	Allowable level	Results
C4:0 Oleic, %	2,4-4,2	3,4
C6:0 Caproic, %	1,5-3,0	2,4
C 8:0Caprylic, %	1,0-2,0	1,5

Index	Allowable level	Results
C10:0 Capric, %	2,0-3,8	3,4
C12:0 Lauric, %	2,0-4,4	3,8
C14:0 Myristic, %	8,0-13,0	11,7
C14:1 Myristoleic, %	0,6-1,5	1,1
C16:0 Palmic, %	21,0,-33,0	29,9
C 16:1 Palmitoleic, %	1,5-2,4	1,6
C18:0 Stearic, %	8,0-13,5	10,5
C18:1 Oleic, %	20,0-32,0	25,2
C18:2 Linoleic, %	2,2-5,5	3,0
C18:3 Linolenic, %	≤ 1,5	0,3
C20:0 Arachic, %	≤ 0,3	0,1
C22:0 Behenic, %	≤ 0,1	< 0,1

The mass fraction of fat in the butter "Na zdorov'e" is no less than 73.0% while mass fraction of sesame oil is more than 1.0%. When analyzing the fatty acid composition of sweet cream unsalted butter with a mass fat content of 72.5%, the results showed that such fatty acids as stearic, myristic and palmic prevailed in it. The maximum amount of oleic fatty acid was detected there. The existence of such essential fatty acids as linoleic and linolenic was determined. The other kinds of fatty acids were also featured in the bovine butter. However, their content did not exceed the allowable level [Table 3].

When determining the fatty acid composition of butter "Na zdorov'e" such fatty acids as undecanoic, tridecanoic, pentadecanoic, eicosatrienoic, arachidonic, heneicosanic, erucic and tricosanoic were found. The content reduction of such fatty acids as caproic, caprylic, capric, lauric, myristic, myristoleic, palmic was revealed in the tested sample of butter "Na zdorov'e". [Table 4].

The content of the oleic, palmitoleic and linoleic fatty acids in butter "Na zdorov'e" and sweet cream unsalted butter with a mass fraction of fat 72.5%, was equal [table 4]. However, the content of such fatty acids as stearic, oleic, linoleic and arachidic has increased in butter "Na zdorov'e". Thus, the technology of adding sesame oil provided the butter "Na zdorov'e" with the missing polyunsaturated fatty acids. The heptadecanoic, gondoinic, lignoceric fatty acids passed into butter "Na zdorov'e" [table 4].

Butter "Na zdorov'e" was examined in terms of fatty acid composition and safety indices in comparison to sweet cream unsalted butter with a mass fraction of fat of 72.5%.

Table 4 **Study results of fatty-acid composition of butter "Na zdorov'e"**

Index	Results
C4:0 Oleic, %	3,4
C6:0 Caproic, %	2,3
C 8:0 Caprylic, %	1,4
C10:0 Capric, %	3,1
C 11:0 Undecanoic, %	< 0,1
C12:0 Lauric, %	3,5
C 13:0 Tridecanoic, %	0,1
C14:0 Myristic, %	10,8
C14:1 Myristoleic, %	1,0
C 15:0 Pentadecanoic, %	1,1
C16:0 Palmic, %	29,2
C 16:1 Palmitoleic, %	1,6
C17:0 Heptadecanoic, %	0,5
C18:0 Stearic, %	10,6
C18:1 Oleic, %	26,8
C18:2 Linoleic, %	3,8
C18:3 Linolenic, %	0,3
C20:0 Arachic, %	0,2
C20:1 Gondoinic, %	< 0,1
C 20:3n6 Eicosatrienoic, %	< 0,1
C 20:4n6 Arachidonic	< 0,1
C 21:0 Heneicosanic, %	< 0,1
C22:0 Behenic, %	< 0,1
C22:1 Erucic, %	0,1
C23:0 Tricosanoic, %	< 0,1
C24:0 Lignoceric, %	< 0,1

On determining the safety performance in bovine butter and butter "Na zdorov'e", such toxic elements as pesticides (HCH-hexachlorocyclohexane; DDT-dichlorodiphenyl trichloromethylmethane), mycotoxins (aflatoxin M1) were detected, but their content did not exceed the permissible levels [table 5], [18].

Table 5 **The results of the examination of safety indices in sweet cream butter "Na zdorov'e"**

Index	Allowable level	Sweet cream butter	Butter with sesame oil
Toxic elements			
Lead, mg/kg, max	0,1	0,0372	0,0396
Cadmium, mg/kg, max	0,03	< 0,020	< 0,020
Arsenic, mg/kg, max	0,1	< 0,0020	< 0,0020
Mercury, mg/kg, max	0,03	< 0,0020	< 0,0020
Copper, mg/kg, max	0,4	0,08	0,09
Iron, mg/kg, max	1,5	0,07	0,07
Pesticides residues			
HCH, mg/kg	1,25	< 0,008	< 0,008
DDT, mg/kg	1,0	< 0,005	< 0,005
Mycotoxins			
Aflatoxin M1, mg/kg, max	0,0005	< 0,0005	< 0,0005

Hence, the technology that has been developed to obtain butter "Na zdorov'e" makes it possible to get the product enriched with polyunsaturated fatty acids with safety indices not exceeding the acceptable levels of technical regulations of the Customs Union "On food safety" (TR TS 021/2011). As a result, the standard of the organization "STO 00430522-001-2016. Bovine butter with flavouring components. Full product specifications" was drafted for butter "Na zdorov'e" with sesame oil with a mass fraction of fat of 73.0% [19].

4   Conclusions

From the findings of the experimental research:
–   it is established that the maximum amount of unsaturated fatty acids (oleic, linoleic , linolenoic) was found in sesame oil. As a result, this oil is used as a kind of additive to bovine butter to enrich its qualities;
–   it is possible to come to the following conclusion that safety indices of oils (toxic elements, pesticides residues, mycotoxins) do not exceed the allowable level of the technical regulations of the Customs Union "On food safety" (TR TS 021/2011);
–   the production technology of butter "Na zdorov'e" has been developed and it has been proved that addition of sesame oil enriches the butter with polyunsaturated fatty acids;

– it has been established that safety indices (toxic elements, pesticides, myco-toxins) in butter "Na zdorov'e" do not exceed the permissible levels of the technical regulations of the Customs Union "On food safety" (TR TS 021/2011).

– the new stardard of butter "Na zdorov'e "STO 00430522-001-2016. Bovine butter with flavouring components" has been drafted.

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COMPETITIVE EXPORT PERFORMANCE IN EU COUNTRIES IN AGRI – FOOD SECTOR

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Abstract

A decisive issue in the EU agri-food market is a competitive performance of each member state. The export competitive performance in agriculture and food industry sector has been influenced by two occasions in past fifteen years, namely the economic crisis in 2008 and the enlargement of EU in 2004 by CEEC´s countries. The export competitiveness in intra-EU trade from 2000-2015 by comparing those sectors, how the export performance have been changed after EU enlargement and how the economic crisis have had an effect on countries export performance. We used EMS indicators were calculated to measure export competitive performance in each member states of EU during three periods. It has been showed that food industry sector and agriculture sector are closed to each other and interconnected, while it has indicated differences in export performance. The main objective of this thesis is to analyse export competitive performance in agricultural sector and food industry of intra-EU trade. We analyse Export Markets Share of selected member state in EU due to data of Eurostat, we have calculated the EMS index, have been split into three periods of time we did for EMS. The Export Market Share index (EMS) describes the export performance in EU area based on its member states. Export market share index could be calculated as the share of export of one sector (agriculture or food industry) with total export of all sectors of all EU countries. According to the results of selected member state we have seen which country has the highest or lowest share on market. The result in EMS agriculture sector of selected countries we may conclude that in the first period France, Spain and Netherland hold the highest market share.

Keywords: *food industry sector, agriculture sector, competitive performance, EMS index*

1   Introduction

The main objective of this work is to analyse export competitive performance in agricultural sector and food industry of intra-EU trade.

We could distinguished many approaches about competitive performance, but we estimate the export competitive performance on specific sector (agriculture and food industry) on each individual states of EU in the intra-EU trade.

We may say that agriculture sector and food industry sector are closed to each other and interconnected. Of course one sector could influence the other sector and vice-a-versa and therefore we are interested in, if they will show similar tendency in their competitiveness in agriculture and food industry sectors or not. Our analyses are concentrated in three basic periods: first from 2000-2003 with respect of EU-15, second from 2004-2009 with respect of EU-27 and last from 2010-2015 with respect of EU-28. Due to those periods we define which country has been influenced by economic crisis and which country has been profited after EU expansion.

Those data came from Eurostat Database in International Trade. We analysed data over fifteen years ago. Those data came from Eurostat Database in International Trade. The export competitive performance has been measured through EMS Index (Export Market Share).

In each country are as consumption, trade or even their production in the case of agriculture, they are influenced due to their policies and also government programs. EU is the second largest exporter and the largest importer of agriculture products. In that time when prices were higher, the export of some products of EU has also increased. Thus CAP was trying to isolate the part of agriculture of European Union based on the findings of market forces. Thank to this, it grants an exemption to both consumers and producers in EU and consequently increase the regulation on countries which have an open agrarian market. (OECD, 2011) Change in size is a remarkable feature of the EU. First of all in 1995 were included only 15 countries (EU15, accession of Sweden, Austria and Finland). In 2004 have joined 10 member states in May 2004 (EU10) and another two in 2007(accession of Romania and Bulgaria). Finally it has brought the total number of 28 member states of EU in 2013. (OECD, 2011)

It is evident that leading position of EU is not stabile. The interdependency of each countries of European Union has brought the globalization of world economy. Production from developed countries to the developing countries is followed by new technologies. Besides that developing countries are better in providing production conditions and moreover cheaper labour force or even in protecting the environment than developed countries. Integration of several countries in the world trade is a result of the growth of competition in that market. (Fojtíková, 2014)

Measuring competitiveness is not easy. Hence we are taking the competitive position of a sector or a firm in the international market and its competitive performance over a time period. According to these measurements, we compared and differentiate countries and time series data. It is possible analyse competitiveness of agriculture and the food industry in28 EU countries by Export Market Share (EMS) Index. An export specialization is evaluated over time with a cross-country comparison for a sector in the international market. (Atkeson and Burstein, 2010) Decreasing of export has been seen in most EU countries due to some problems. (WTO, 2013a) Nevertheless that economic crisis has had a negative impact in the world trade in a short time there were another factors. Especially shift in production, another new technological innovations and different forms of doing business. Demographic changes are the main components with respect to the future development of international trade. Those could influence trade, investments which encourage the development in technologies, and resources. The same affects transportation and institutions, which are determinant of comparative advantage. (WTO, 2013b) It is evident that there are differences for each individual country of European Union regarding export performance as well as integration into international market. According to Redding and Venables (2004) the important determinant of export performance is an easier access to international market, and this just point out the geography. But it also depends on internal geography and the other domestic factors of each member state.

2   Data and Methods

We use diverse information resources as the literature overview and data taken from Eurostat Database. We will compare and differentiate countries and time series data. It is possible to analyse competitiveness of agriculture and the food industry in 28 EU countries by Export Market Share (EMS) Index. These indicators don't analyse the determinant of export performance, in our task we are going to provide an overview for countries as a whole. According to these indicators over time we could analyse the gain or loss of competitive performance. Also we are able to calculate competitiveness from different angles.

The Export Market Share index (EMS) describes the export performance in EU area based on its member states. Export market share index could be calculated as the share of export of one sector (agriculture or food industry) with total export of all sectors of all EU countries. Due to this index we have considered which country has the highest share on EU market.

The EMS index describes the export performance in European Union area based on its member states. Due to this index we have considered which country

has the highest share on European Union market. EMS index could be calculated by the following equation:

$$EMS = \frac{\text{export of one sector (agriculture or food industry)}}{\text{total export of all sectors of all European Union countries}}$$

Our data came from Eurostat database of international trade which have been necessary to EMS. Exporting in the intra-EU market from 2000 to 2015 was used for the categories related to agriculture and food industry. The data consist from 2-digits codes (HS-2) from 01 to 24 (except of animal feeding, tobacco, fisheries and agricultural non-foodstuffs) and were summarized into two sectors: agriculture and food industry, which are explained in Table 1.

Table 1 **Division of goods into two sectors: agriculture and food industry following by Eurostat**

Agriculture
01-Live animals
07-Edible vegetables and certain roots and tubers
08-Edible fruits and nuts;peel of citrus fruits or melons
10-Cereals
12-Oil seeds and oleaginous
Food Industry
02-Meat and edible meat offal
04-Dairy products
09-Coffee,tea,mate,spices
11-Products of milling industry,malt, starches
15-Animal or vegetable fats and oils
16-Preparations of meats, fish
17-Sugar and sugar confectionery
18-Cocoa and cocoa preparations
19-Preparations of cereals, flour,strach or milk
21-Miscellaneous edible preparations
22-Beverages,spirits and vinegar

3   Results and Disscussion

Our analysis indicates that in the intra-EU trade, the highest EMS we consider in big countries, which possess exactly 90.14% of agriculture sector in EMS and 77.23% of food industry in EMS. In this case of agriculture sector the largest share belongs to France (22%) in the first period, whereas in the second period Netherland is the largest exporter (19.35%). On the other hand in food industry

sector, France still has the largest share on the market in first period (17.77%) but Germany (18.43%) has overtaken and has hold higher shares.

Our particular conclusion is that the countries with highest EMS don't have to be specialized in both sectors, and it is due to the fact of total exports. Moreover EMS in agriculture sector among big countries doesn't show increase in the second period and thus were critical tendency in third period. On the other side growth of EMS in food industry sector in second period has belonged only to Germany, and a little bit growth of EMS has been seen in the third period for other countries (Netherland, Germany, Italy and Spain).

For the CEEC´s countries after entry into EU we may say that in EMS they have an expansion in both sectors, also during the economic crisis but regardless of Cyprus and Malta. In fact there is a strong competitiveness between each other. In several countries of CEEC´s the export competitive performance has increased during economic crisis in agriculture sector (Bulgaria, Slovenia, Slovakia, Lithuania, Latvia, Czech Republic and also Estonia). On the other side of food industry sector the growth in export competitiveness during the economic crisis and countries which suffered belongs to Poland, Malta, Hungary and Cyprus. According to data Croatia after the entry in EU is more export competitive in agriculture sector rather than in food industry sector.

3.1   Education

The analysis of the EMS we have chosen to divide our data, which came from Eurostat Database, into three time periods: the first period is from 2000-2003 for EU-15 member states, the second period is from 2004-2009 for EU-27 member states, because of the fact that in 2004 came into EU another ten member states and the last two member states came in the year 2006. We also examine how the economic crisis may have an effect on export performance in 2008. The last period is from 2010-2015 where in 2013 have joined the last member state Croatia. Finally, we point out in the graphs the development tendency for each period of selected states of EU. We have divided mainly those periods because of the fact that it is possible to better analysed their export competitive performance and we also give to the fore the economic crisis.

3.2   EMS Big Countries

The EMS in agriculture sector and food industry sector of big countries includes seven countries. Based on the calculation of Eurostat Database and unifications of values we make a table (Table 2 and Table 3) of big countries and split them into three periods.

Table 2 **EMS of Big Countries in agriculture sector**

EMS Agriculture			
Big Countries	*2000 - 2003*	*2004 - 2009*	*2010 - 2015*
France	22,00%	17,33%	14,81%
Spain	21,17%	17,52%	17,14%
Netherland	19,86%	19,35%	19,33%
Belgium	10,71%	9,36%	7,85%
Italy	8,15%	7,30%	6,61%
Germany	8,03%	9,36%	8,14%
Luxembourg	0,22%	0,20%	0,14%

Source: Author´s own calculations based on Eurostat Database in International Trade.

The result in EMS agriculture sector of big countries (Table 2) we may conclude that in the first period France, Spain and Netherland hold the highest market share. Consequently Belgium, Italy and Germany have lower market share in agriculture sector. Despite of those countries only Luxembourg has in the agriculture sector the lowest export market. If we compare it with the second period, in France and Spain EMS decrease about few % and thus Netherland became the biggest holder in agriculture sector as well as in third period. We may contribute (in Table 2) that during the economic crisis the EMS of several big countries have fallen and only Netherland was trying to keep their EMS in agriculture sector in the last period. The progress of big countries in agriculture sector of EMS we conclude in the Figure 1.

Figure 1 **Progress in agriculture sector of Big Countries**
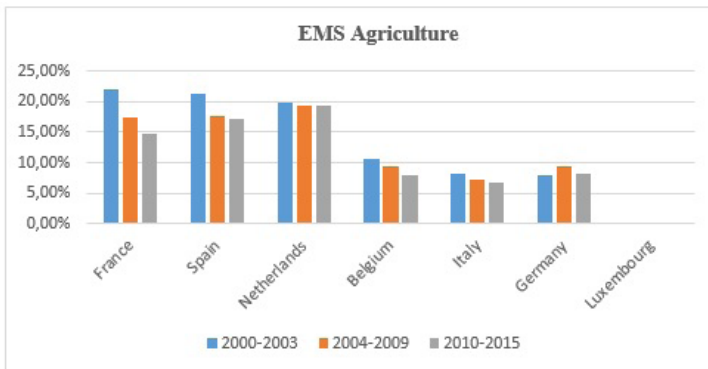
Source: Own Processing based on Eurostat Database in International Trade.

We may contribute (Table 3) neither the result in EMS food industry sector of France, Belgium and Italy didn't change excessively nor their position. The most serious change belongs to Germany for which the change became in food industry sector and increase during all three periods. The second change belongs to Spain for which it is an opposite, while that country holds the second largest EMS in agriculture sector. The progress of EMS in food industry sector of big countries is shown in Figure 2.

Table 3 **EMS of Big countries in food industry sector**

EMS Food Industry			
Big Countries	*2000 - 2003*	*2004 - 2009*	*2010 - 2015*
France	17,77%	14,47%	12,46%
Netherland	17,09%	15,29%	15,40%
Germany	16,77%	18,43%	18,73%
Belgium	11,23%	9,59%	9,01%
Italy	7,55%	7,42%	7,55%
Spain	6,46%	6,26%	6,41%
Luxembourg	0,36%	0,31%	0,34%

Source: Author´s own calculations based on Eurostat Database in International Trade.

Figure 2 **Progress in food industry sector of Big Countries**
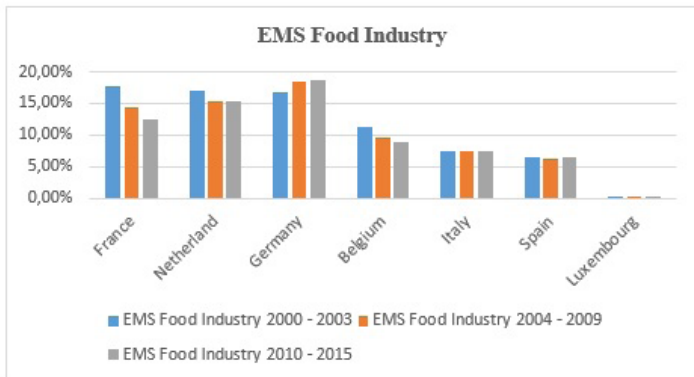
Source: Own Processing based on Eurostat Database in International Trade.

Our analysis indicates that in the intra-EU trade, the highest EMS we consider in big countries, which possess exactly 90.14% of agriculture sector in EMS and 77.23% of food industry in EMS. In this case of agriculture sector the largest share belongs to France (22%) in the first period, whereas in the second period

Netherland is the largest exporter (19.35%). On the other hand in food industry sector, France still has the largest share on the market in first period (17.77%) but Germany (18.43%) has overtaken and has hold higher shares.

France has lost its competitive performance after second and third period in both sectors. Our particular conclusion is that the countries with highest EMS don't have to be specialized in both sectors, and it is due to the fact of total exports. Moreover EMS in agriculture sector among big countries doesn't show increase in the second period and thus were critical tendency in third period. On the other side growth of EMS in food industry sector in second period has belonged only to Germany, and a little bit growth of EMS has been seen in the third period for other countries (Netherland, Germany, Italy and Spain).

3.3   EMS CEEC´s countries

The EMS in agriculture and food industry sector of CEEC´s countries includes thirteen countries. It was composed from twelve member states of EU till the year 2012. However Croatia has joined in 2013 as the last member state. Based on our calculations of Eurostat Database and unification of values we make tables (Table 4 and Table 5) of CEEC´s countries and split them into two periods.

Table 4 **EMS in agriculture sector of CEEC´s countries**

EMS Agriculture		
CEEC´s	*2004 - 2009*	*2010 - 2015*
Poland	2,83%	3,16%
Hungary	2,64%	3,30%
Czech Reup.	1,31%	1,83%
Romania	0,88%	2,06%
Slovakia	0,78%	1,27%
Bulgaria	0,57%	1,78%
Lithuana	0,48%	0,72%
Latvia	0,18%	0,51%
Slovenia	0,17%	0,45%
Cyprus	0,15%	0,10%
Estonia	0,09%	0,19%
Malta	0,01%	0,00%
Croatia	-------	0,22%

Source: Author´s own calculations based on Eurostat Database in International Trade.

The result in EMS agriculture sector of CEEC´s countries (Table 4) we may say that those countries have hold the lowest EMS compare with either big countries. Only first three countries such as Poland, Hungary and Czech Republic have EMS greater than 1%. During all periods their EMS have increased. In Romania the export market share rapidly increased in third period and thus gained the third position of CEEC´s countries in agriculture sector. The lowest holder of EMS in agriculture sector is Malta (almost closed to 0%). For Croatia the data were not available because it was not yet a part of EU. In third quartile when Croatia became a part of EU has hold just 0.22% of EMS. The progress of EMS in agriculture sector is shown in Figure 3.

Figure 3 **Progress in agriculture sector of CEEC´s countries**
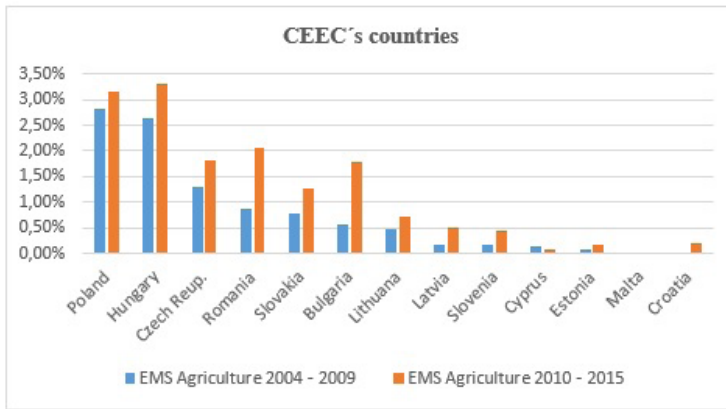
Source: Own Processing based on Eurostat Database in International Trade.

Table 5 **EMS in food industry sector of CEEC´s countries**

EMS Food Industry		
CEEC´s	*2004 - 2009*	*2010 - 2015*
Poland	2,94%	4,69%
Hungary	1,27%	1,66%
Czech Reup.	1,10%	1,59%
Romania	0,69%	0,94%
Slovakia	0,43%	0,60%
Bulgaria	0,24%	0,48%
Lithuana	0,22%	0,28%
Latvia	0,20%	0,28%
Slovenia	0,17%	0,52%

EMS Food Industry		
CEEC´s	*2004 - 2009*	*2010 - 2015*
Cyprus	0,14%	0,21%
Estonia	0,03%	0,04%
Malta	0,01%	0,01%
Croatia	-------	0,18%

Source: Author´s own calculations based on Eurostat Database in International Trade.

We may conclude (Table 5) that the results in agriculture sector and the results in food industry sector approximately did not change. Poland, as a part of CEEC´s countries, has the highest export market share in both sectors and it seems rapidly increasing in food industry sector. A little bit increase in food industry rather than in agriculture sector is characterized for each countries. The data are not available for Croatia in second period because of the fact that it wasn't a part of EU yet. After they have joined in 2013 their EMS is a little bit lower than in agriculture sector. Despite of economic crisis which started in 2009, EMS in food industry sector of each CEEC´s countries has increased. If we compare CEEC´s countries with big countries in both sectors, our opinion is that they have been at least influenced by economic crisis. The progress in food industry sector of CEEC´s we consider in Figure 4.

Figure 4 **Progress in food industry sector of CEEC´s countries**
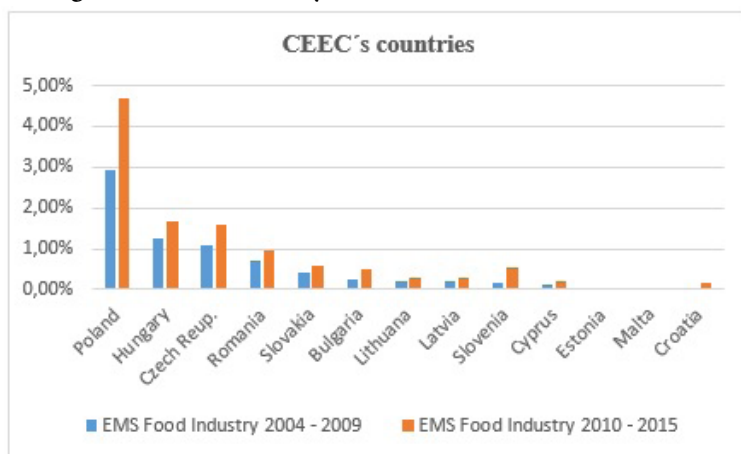
Source: Own Processing based on Eurostat Database in International Trade.

4   Conclusion

The aim of work was to evaluate the export competitive performance at a sector level in intra-EU trade within the period of last fifteen years, which have been divided into three basic periods. Also we assessed an effect of EU expansion and economic crisis.

We could say that there is a relationship between agriculture and food industry sector concentrate in intra-EU market. Several countries play a key role in exporting. France and Netherland are holders of the highest export market share in agriculture sector, while according to our calculations in food industry sector Germany has hold higher export market share. Countries such as Spain, France, Netherland and Italy have the largest comparative advantage in agriculture. However in food industry sector Germany, Luxembourg and Belgium have higher comparative advantage. It seems that there is a relationship between agriculture sector and food industry sector, which are interconnected. However they don´t have a similar tendency in export performance and thus we couldn´t examine which one is pushing or pulling to the other one.

Our analysis showed that the CEEC´s countries after an entrance into the European Union, were competitive and have had high comparative advantage in agriculture sector. It is clear that during the economic crisis might be a decline in their values, but in several cases we observed a positive effect.

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GMO-BASED OR ORGANIC AGRICULTURE: WHAT CHOICE MIGHT BE BETTER FOR FOOD SECURITY IN THE LONG TERM PERSPECTIVE?

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Abstract

Taking into account emerging fundamental challenges to the food security such as climate change and population growth, a number of countries has started to implement into practice two alternative ways to the agricultural production, that are technologically opposed to each other, but jointly they are forming alternative approaches to the conventional agriculture. First of them is based on the genetic engineering and creation genetic modified organisms (GMO), and the second one – on organic production technologies.

The article considers international experiences of the implementation of these two approaches, their effects in socio-economic dimensions and impact on the food security and the food safety.

Basing on assessment of examples of the implementation of modern approaches in agriculture in international practice, the article provides suggestions on possible state-grade actions that can be considered for insuring the development of organic agriculture as an important prerequisite of the food security and the food safety in the future.

Keywords: *GMO, organic agriculture, agricultural policies, food security, food safety.*

JEL Classification: *Q12, Q13, Q16, Q17, Q18*

1   Introduction

Nowadays in finding appropriate alternatives to the conventional agriculture two relatively modern approaches such as GMO-based and organic-based models of

agriculture are still a subject for dispute and discussion among researches, professionals and experts.

The emergence of both was conditioned by a need to find solutions that could mitigate negative effects associated with emerging challenges to the food security. Among them there are population growth and predicted scenario of growing hunger, climate change and disturbances in natural weather cycles, as well as a reduction of natural land and soil degradation.

According to expectation of the UN in near future humanity is going to find it increasingly difficult to meet growing demand for food. It is expected that by 2050 the world population will increase by 34% to 9.1 billion people from present 6.8 billion people [1]. It means that if population is keeping its current rate growth by 2050 the world food production should increase by 70% [2].

Climate change is going to seriously affect the decline in food production due to increased level of the average annual temperature, droughts and a reduction in water resources. Mainly it concerns the production capacity of primarily cereals, vegetables, fruits, livestock products and fisheries.

Due to the development of the urbanization, the fertile land of the planet is continuously reducing. According to a report, carried out under framework of the United Nations Environment Program (UNEP), about 849 million hectares of natural land of the world area is expected to degrade by 2050 [17].

Food safety is also important taking into consideration the abundant usage of chemical elements and additives in the food production. For example, to increase productivity and defend agricultural crops from damages caused by weeds and various pests, modern science has elaborated and equipped food producers and farmers with a variety of herbicides, pesticides, insecticides, fungicides, defoliants, phytoregulators, growth stimulants and much more. It is also not rare the usage of additives and components, hormonal preparations, antibiotics, growth regulators, productivity stimulants, protein-vitamin concentrates of petroleum and other origin. A considerable part of these substances or products of their decomposition remaining in food gets into our organisms.

Handling growing demand for healthy food in necessary quantities requires to secure intensive and extensive expansion of production capacities in the agricultural and food sectors on the basis of the mobilization of modern scientific, engineering, industrial and marketing ideas.

Thus, the implementation of GMO-based and organic-based models in agricultural production should be viewed as objective answers to emerging challenges to food security. In other words, currently mankind is witnessing the rapid development of new approaches designed to achieve an optimal agriculture output and solve challenges that food security is facing.

By the present, many countries of the world have accumulated necessary knowledge, technology and experience to outline further directions of development of the agriculture and food industry in order to guaranty the four main components of food security in the future.

Before choosing an optimal model of agriculture each country should note that both GMO-based and organic-based models of agricultural production have their positive as well as negative sides. The choice in favor of one of them depends on many factors related to level of economic, scientific and technological development, conditions of trade, and environmental and climatic aspects.

Thus, the aim of the article is to analyze the international experience of the implementation of GMO-based and organic-based models in agricultural production, and to evaluate their impact in socio-economic dimensions in long run perspective. Basing on assessment of the usage of these approaches, the article provides a number of basic suggestions on possible state-grade actions that can be considered for insuring the development of organic agriculture.

2   Data and Methods

In attempt to provide proposals that can be used in the development of corresponding agricultural policies at the state level, authors summarized results of a comparative analysis of the world experiences of the implementation of GMO-based and organic-based agricultural production and related trade.

During the preparation of the article authors used statistical data provided by world renowned institutes and organizations that are dedicated to studies of GMO-based and organic-based agriculture and related issues, as well as publications and articles of authors that are focusing special attention on different aspects of food security and food safety.

In some cases, while providing examples of implementation of GMO and organic approaches in agriculture, authors consciously did not indicate names of specific companies and states, intending to not provide unwilling disturbances in the general society perception of these two modern concepts of agriculture production.

3   Results and Discussion

This section provides summarized results of the assessment of international experiences of the development of the GMO-based and organic-based production and related trade. In particular, the assessment contains main features of both models, including their role in the world agricultural market, the importance of these two models for national agricultural sectors, positive and negative examples

of the implementation of these two approaches in agriculture and their impact on the food security, food safety and "environment" safety.

Based on the analysis of the best practices of the implementation of the organic model of agriculture, the potential for the development of organic farming can be strengthened through the introduction of supportive measures at the state level.

3.1 Assessment of the development of agriculture based on GMO technologies

Agricultural production based on GMO technologies involves methods of genetic correction of structural properties of living and plant organisms. This correction is being achieved with help of genetic engineering and creation of genetically modified organisms. In other words, GMOs are organisms whose genetic material has been artificially altered. These changes would not be possible to achieve in nature by means of the reproduction or the natural recombination. Agriculture production based on GMO technologies are used to improve the qualitative properties of plant varieties and to increase the animal population in order to reduce production costs and increase the consumer properties of final products.

Main characteristics that are introduced at the present time in plants are resistance to herbicides and insect pests. Technologies of this type are used in commercial agricultural and food production, especially in those countries whose territories are prone to frequent droughts, floods and other natural disasters, including tornadoes, hurricanes, etc. Accordingly, these territories can be referred as zones of unsustainable farming.

In the period 1996 - 2016 the total world area allocated for commercial production of GMO-based agricultural products was expanded to 185.1 million hectares. The production of agriculture GMO products for commercial purposes is carried out by 26 countries of the world, including 19 developing and 7 developed countries. In 2016 about 90% of the world's GMO cultivation area was situated in five countries of the world, including the United States (39%), Brazil (27%), Argentina (13%), India (6%) and Canada (6%). In terms of geographical division, in 2016 88% of this area was situated in North and South America, 10% in Asia, 2% in Africa and less than 1% in Europe [14].

The implementation of GMO technologies in agriculture and the food industry is considered among important factors of making a profit in the agricultural sector. The scale of cultivated plant crops based on these technologies in some countries of the world now exceeds the population of "paternal" (original) plants. For example, in the United States 90% of all corn, soy and cotton now contain GMOs [16].

In 2016, the share of certain GMO-based products in the global agriculture production achieved respectively: soybeans - 78%, cotton - 64%, maize - 33%, rapeseed - 24% [15].

Opponents of GMOs commercial agriculture point out that the consequences of using of such technologies are still poorly understood and learned. There are some arguments and facts that prove threat to human health, animals, and the environment, including through the violation of natural biodiversity of nature.

Basing on studies and experience of the implementation of GMO technologies in agricultural systems of individual countries, it is possible to point out several negative effects that affect the sustainable development of agricultural complexes and farms, especially in developing and least developed countries.

In some cases, farmers have a hypothetical possibility of losing access to large markets for their products, i.e. to the markets of countries that restrict or even ban the importation of GMO products. At the same time, losing the access to these markets can be fatal for producing countries because the implementation of GMO-based agriculture has ability to affect all parental plants so that plants of certain types can lose their original, inherent natural qualities and properties forever.

Another controversial aspect of the application of GMOs from market point of view is the monopolization of the world production of seeds and related trade. Only a few companies of the world currently are main producers of genetically modified (GM) seeds. Seed producers patent their inventions and prohibit the use of seeds in other manner than it is envisaged by terms of a contract concluded between a farmer and a company. Often seeds cannot be postponed for sowing in the next year. Inappropriate usage of seeds can be considered as a violation of contract conditions and subsequently followed by penalty consecutives. Thus, for each sowing campaign farmers need to purchase new lots of seeds. In this way, producers of GM seeds using intellectual property rights separate farmers from one of the main means of production – seed grain.

The monopolistic position of GM-seed producers represents some risks for farmers. Having some unseen internal problems in production processes or intercorporate logistics, seed producers can be unable to supply seeds in required volumes. In turn, it creates risks for accuracy of functioning of seed supplies that may lead to the disruption of sowing campaigns at the state scale. Thus, shortages of seed grain have a certain potential to undermine the stability of food markets as a whole, and to restrain ability of farmers to manage properly their production and financial plans as well as accomplishment of agreements.

There are examples when the use of GM herbicides led to an increase in production costs for farmers (e.g. Brazil) that used them to control weeds in soybeans'

growing. In several cases weeds adapted to GM herbicides. That entailed additional costs for purchasing more herbicides of this type or other varieties of herbicides [10].

Concerning the impact of the agriculture based GMO technologies on the environment and human health some evidences show that GM products pollute natural sources of food at a significant pace, with serious consequences. Additionally, pollination by GM plants with traditional "neighbors" leads to mutations of the latter and the loss of their traditional characteristics.

3.2 Assessment of the development of organic agricultural production

The development of organic farming can be considered as another alternative model to conventional type of agriculture. In accordance with the definition of the UN, organic agriculture is a holistic production management system which promotes and enhances agro-system health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system [8].

Organic farming can be defined as an approach to agriculture that considers in production processes the socio-economic and environmental aspects of food security by prohibiting GMO and minimizing usage of external resources in the production, maximizing the use of local renewable resources, managing agro ecosystems and using the market to cut production costs.

Currently, the organic agriculture and related trade are dynamically developing segments of the world market of agricultural and food products. According to the organic market statistics issued by The Research Institute of Organic Agriculture (FiBL), in 2015 the world area allocated for certified organic production achieved 50.9 million hectares [11]. Growth was noted in all spheres of organic production: territory, producers, and retail sales. The regions of the world with largest shares in the total world area designated for organic agriculture are Oceania (45%), Europe (25%) and Latin America (15%). The main countries – owners of biggest areas for organic cultivation are Australia (22.7 million hectares), Argentina (3.1 million hectares) and the United States (2.0 million hectares). In 2015, the number of organics producers in the world, including small farmers, achieved approximately 2.4 million [11].

According to some estimates, in 2016 the world market of organic food and beverages amounted to about 90 billion US dollars [13]. Some international

experts are expecting that the world market of organic food by 2025 can reach 320.5 million US dollars [5].

Positive examples of the development of organic production, as well as its socio-economic importance, create good economic bases for further development of organic farming and agriculture, including export-oriented production. The use of organic farming creates positive effects in the field of improving the food safety. According to the Association of Organic Producers of the United States, if every farmer in the United States produces products in accordance with the requirements for organic production, it will allow to remove from food products about 102 million kilograms of persistent and harmful pesticides [4].

Experience of using the organic agriculture shows that it has great importance in the social dimension, significantly contributing to the development of rural and remote regions. In particular, it stimulates the development of entrepreneurship in rural areas by reducing the scale of migration from rural areas to cities. Various groups of society are given the opportunity to participate in profitable agricultural production. In addition, organic farming, by recognizing the value of local population and traditional knowledge, provides a basis for building organic production in conjunction with modern technologies that strengthen the socio-economic potential of farmers, cooperative farms or local communities. Aggregating all these factors, it is necessary to draw a conclusion about the high potential of organics directly contribute to the increase of food security.

Due attention to the development of farms and agricultural cooperatives is highly important while developing a national strategy required for enhancing of the food security. According to FAO, there are about 570 million farms in the world. More than 500 million of them are attributed to family-type of farms, which together account for about 56% of world food production. Of these 500 million farms, 475 million own agricultural lands with size less than 2 hectares. 74% of the total number of farms is located in the Asia-Pacific region, with China that accounts for 35% of farms and India - 24% [7].

One of the driving forces behind the development of the global organics market is the growing demand for "clean" food products, which, for example, currently is demonstrated by the EU. There are examples according to which the population is increasingly seeking to consume safer food even in countries that are producers of GM products for commercial use (Brazil, India), or in countries that in the recent past have had rather low requirements for the quality of food products (China).

For instance, the demand for organic food in China is rising year to year, as incomes of the middle class are growing. Chinese citizens express fears that they eat unhealthy food that harms health. Nowadays, China is actively importing raw materials

and semi-finished products for the production and exporting organic products. China imports food products that are either not produced by domestic producers, or produced only in small quantities. After a series of scandals in past that were related to the identification of poor quality of Chinese organics abroad, most of the exported products currently are sold in foreign markets under the guise of products of conventional agriculture. With the aim of reviving the trust of both foreign and domestic consumers to products of the national agriculture, for recent years the Chinese government has been tightening regulation in the sphere of organic production.

Assessing benefits and limitations of organic agriculture in the context of food security is complex. The impact of the transition to the organic agriculture depends not only on the farmer and agriculture, on their skills and available resources, but also on relevant support from the state. In many developing countries, organic production is still encountered with a healthy dose of skepticism, since organic products are in most cases more expensive than similar products obtained from the conventional or GMO models of agricultural production.

According to FAO, the productivity of organic agriculture depends on the type of agricultural production used earlier in farm territories [9]. A comparative analysis of productivity while transferring cultivated areas from conventional agricultural model to organic model, according to FAO, has the following correlation:

- In industrialized countries, the use of organic systems may reduce yields. The level of yield reduction depends on the intensity of the external inputs made for enhancing soil fertility in the past;
- In new areas, for example, obtained by irrigation, the conversion to organic agriculture gives almost the same productivity as it has conventional agriculture;
- Agriculture territories that uses traditional rain watering in agricultural production (external inputs for enhancing the quality of soil is minimal), after conversion to organic agricultural model will have a certain potential to increase yields.

The study, that has been conducted for 10 years by the Swiss branch of The Research Institute of Organic Agriculture (FiBL) in Kenya on the efficiency of crop cultivation using both organic and conventional farming models, has showed certain economic advantages in favor of organic farming production [12].

In particular, the results of the research disproved the proposition that organic farming requires a larger territorial space to achieve the same level of profit as conventional model of agriculture. Taking into account the reduction in the cost of purchasing a variety of chemicals used to increase the efficiency of agricultural production, incomes of "organic" farmers start to increase in five years. The use of the organic model in agricultural production proved its profitability not only for ecosystems, including increasing soil fertility, but also human health.

Similar studies on the profitability of using the organic farming model for different types of products, conducted in India and Bolivia, showed also positive results.

Taking into account above mentioned, it should be noted that the development of organic agriculture, organic farms and cooperatives in many countries of the world demonstrate a big potential to be an important component of food security in the national context as well as in international food supply chains.

3.3   State measures for support of the development of organic agriculture

The potential for the development of organic farming can be strengthened through the introduction of the following supportive measures at the state level.

In particular, to ensure the greatest positive economic effects in the organic production, government measures should include the development of advanced agro-technologies, engineering solutions and appropriate economic incentives for the innovative agricultural production.

One of the areas of state support should be dedicated to increasing productivity of organic agriculture. In this regard, it is necessary to envisage greater allocation of financial resources for conducting relevant researches in the field of organic agriculture.

According to the FAO, organic farming helps the soil to preserve nutrients and water in the process of launching so-called nutritional and energy cycles, achieved on the basis of organic technologies. They imply the development and application of such organic farming practices as crop rotation, crop cropping, symbiotic associations, inter-cropping, minimum tillage and the use of organic fertilizers. These methods contribute to the preservation of soil life and improve the structure and stability of soil fertility.

The development of organic farming requires the adoption of new rules and regulations, as well as the introduction of programs to train farmers in approaches and rules of organic production. In many developing countries, organic standards for processing crops and livestock products have not yet been adopted. In this regard, efforts should be made to promote the certification of organic farming and livestock.

Under conditions of free competition, it is necessary to inform consumers about different types of products in order to allow them to make an informed choice in favor of purchasing conventional, organic or "combined" types food products. It is also important to develop appropriate labeling.

From the point of view of supporting organic farming, it is also important to provide the same conditions of support at the state level as the traditional type of agriculture uses. Thus, the prices for products obtained within the framework of

the traditional model of agriculture are being reduced artificially through government subsidies aimed at supporting the development of conventional agriculture. Subsidies provided within the framework of the development of the traditional model of the agro-industry neutralize the impact of external factors on the profitability of conventional agricultural production, and, accordingly, restrain the growth of prices for final consumers of food.

Among the directions of economic policy in the field of organic support, it is necessary to note the need to support "direct" supply chains by reducing the number of intermediaries in order to ensure fair prices for farm products and an equitable distribution of profit margins throughout food supply chains. For example, in recent years, supermarkets in many countries around the world are increasing spaces allocated for the sale of organic products, including their sales on the street.

4   Conclusion

While GMO-based agriculture has a certain potential to guaranty a vast supply of food, under terms of social expectations it needs to meet a balance between effective production, food safety and "environmental" safety that in the future will increase their importance for sustainable food agriculture development. Organic agriculture and farming, based on best practices and experiences, makes it possible to meet the mentioned balance and to solve a number of important socio-economic issues in the long-term run.

In the same time, it would be wrong to consider organic farming and agricultural production as an antagonistic model to the GMO-based agricultural production. At the present stage it is not a panacea for solving food problems such as hunger and malnutrition. However, currently the organic model of agricultural management is demonstrating sustainable development, offering a wide range of economic and social benefits.

The development of organic agriculture has positive effects not only on human health. It also has numerous positive effects in the field of environmental protection and ecology. Thus, providing support for the development of organic agriculture can be considered as an important investment in the economic and healthy development of a country.

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EXPORT COMPETITIVENESS OF SLOVAK COMPANIES ON FOREIGN MARKETS

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Abstract

Overall agrarian trade of the Slovak Republic was greatly affected in 2004, when Slovakia joined the European Union, which meant adapting to the new challenges arising from the terms of the Common Agricultural Policy of the European Union. The European Union and its member countries concluded number of preferential agreements to eliminate trade barriers and to improve trading on domestic and foreign markets. The aim of the paper is to evaluate the development tendencies in the Slovak Republic's inclusive trade while pointing to the achieved competitiveness towards selected countries of the world and in particular to V4 with a special aspect of agro-food commodities. Development of Slovak agrarian trade share is analyzed related to the total trade in Slovak Republic, European Union countries and third countries. To obtain relevant data on proven comparative advantages of the Slovak Republic in agricultural and food commodity group with third countries, index of comparative advantages RCA is used.

Keywords: *competitiveness, export, export competitiveness, import, terms of trade*

JEL Classification: *F1*

1   Introduction

The business standard of the competitive strategy of companies (regional theory also emphasizes the necessity of regional competition), enables them to compete effectively and thereby strengthen its position on the market. Porter (1994) is presented by many series of authors in their publications. Nowadays, the positions of the leading exporter are the most accepted in the area of strategy, namely Porter. Practical experience and current theoretical research confirm that in global

competition or competition of companies and regions in the globally developing world, it is impossible to maintain a position among competitors without changing the standard notion of a competitive strategy.

2   Theoretical and Methodological Approaches

Examples of trying to get a new look, responding to changing conditions in the global economy and non-economic competition are all in common. However, the best-known ones include for example, publications of Gibson and others - A New Image of the Future (Gibson et al., 1998).

In the book Change Management Guide - Trends in Management by Häuser et al. (2003) it is presented as an example of the "new path" of the growing spiral of competitiveness "arising from the internal functioning of an enterprise, developing as a success of successes in successive combinations of competitive factors such as innovation, speed, quality, cost and labour productivity.

Being competitive means higher or more reliable incomes, a better position in a ranking, which has been built from compared entities (Chajdák, Arbe, Novotná, 2011).

Competitiveness at the corporate level can be understood as an ability to produce and sell a particular product, subject to the preservation of profitability. A competitive enterprise must be able to reduce the resulting product price if necessary and offer a higher quality than its competitors. This argument can be relying on a production theory where the company should drive its business to maximize profit, puts pressure on its production capacity, which is conditional on the volume of sales while not missing an opportunity to make a profit within the market. It is the profit that accelerates competitive firms to market, and the loss is causing a loss of competitiveness and a market position at the same time as a result of the production theory, generating profit and expanding on the market. Only companies, which produce their products with a lower level of costs than the market product price, and at a lower cost than competitive are able to keep their position. Therefore, the cost level becomes one of the decisive determinants of the company's competitive ability (Marinič, 2008).

3   Development Tendencies in the Export Competitiveness of Slovak Enterprises

The economic results achieved over the past period have highlighted the need to improve competitiveness in order to achieve higher sustainable growth. A detailed analysis of Slovakia's export competitiveness, taking into account a number of new criteria, suggests that Slovakia has been able to maintain the positive trend

of international competitiveness in the post-2008 challenging crisis period. An important role was played by price and non-price factors.

The interconnectedness of the competitiveness of economic growth and real convergence (convergence) is documented by a simple relationship between the balance of payments, current account balance, performance developments and price level in EU countries. Countries with high deficits in the pre-crisis period faced a more pronounced fall in both price level and performance (Table 1).

Table 1 **Overview of Slovak Foreign Trade Development in the years 2014-2016**

	In mil. €		
	Import	**Export**	**Saldo**
Year 2014			
Total trade	60 152,2	64 800,9	+4 648,7
Agricultural and food products	3 787,4	2 749,4	-1 038,0
Share in %	6,3	4,2	
Rok 2015			
Total trade	64 562,3	67 865,2	+3 302,9
Agricultural and food products	3 830,9	2 734,8	-1 096,1
Share in %	5,9	4,0	
Rok 2016			
Total trade	66 401,8	70 073,9	+3 672,1
Agricultural and food products	4 103,3	2 829,8	-1 273,5
Share in %	6,2	4,0	

Source: Own processing, 2018.

The favourable values of the underlying external balance indicators (current account surplus and surplus of foreign trade in goods) recorded in the recent period indicate that Slovakia does not have problems with the location of its production abroad. However, a more objective assessment of export competitiveness and sustainability requires an analysis of more comprehensive indicators providing more accurate information.

The liberalization of the international business environment and the use of modern technologies give entrepreneurs new opportunities to establish themselves on foreign markets while at the same time increasing the global competitiveness of Slovak products on foreign markets and the sustainable development of the national economy and especially the entry of the Slovak Republic into the EU became a great business for Slovak business entities, an opportunity to develop international business activities.

The single internal market (free movement of goods, services, people and capital) means that businesses in EU Member States should not be restricted. Certain restrictions are exceptional and consist mainly of measures to protect the safety of consumer's health, the environment, the qualifications required for pursuit of regulated professions and trades, such as doctors, accountants and architects.

In spite of the restrictions outlined, in 2004 Slovak businesses opened up markets with almost 500 million inhabitants with a stable business and legal environment and a well-functioning institutional background. The share of intra (intra) trade in the total intra (intra + extra) trade of the Slovak Republic in mil. EUR is the following for the years 2013 to 2016 (Table 2).

Table 2 **Proportion of intra merchandising of Slovak Republic**

Year	Export			Import		
	Extra + intra	Intra export	%	Extra + intra	Intra import	%
2013	64173,2	51113,8	82,77	59939,9	37234,4	62,12
2014	64721,1	54416,1	84,80	60018,7	37803,6	62,99
2015	67853,2	57826,0	85,21	64562,3	42609,5	66,00
2016	70073,9	59686,8	85,18	66401,8	44704,5	67,32

Source: Own processing, 2018.

Table 2 clearly shows the share of intra-EU exports to EU Member States in the referenced years is 85 %. It exports to the third countries only the remaining 15 %. The intra-EU share of EU countries reached 67.32 % in 2016.

On the foreign markets, companies can use different strategies for international business. When choosing a strategy for a target market, it is always necessary to take into account the specifics and maturity of the market and a whole host of other factors. This is mainly about trade and political conditions - customs and foreign exchange regime, exchange rate policy, non-tariff trade policy instruments (technical barriers, quantitative restrictions, minimum prices, anti-dumping duties, import surcharges, import deposits).

In practice, international trade and international business are implemented in various forms that can be broken down into:
- export and import of goods and services (business operations),
- unqualified forms of capital investment (licenses, franchise and management contract,
- capital intensive forms of entry into international markets (e. g. foreign direct investment).

In recent years, an important document for improving foreign policy has been the document "Strategy for Export Policy for 2007-2013", which directly follows in an extended form the next document "The Strategy of External Relations of the Slovak Republic for 2014-2020", which, based on the decision of the Government Council The SR serves to support export and investment of March 25, 2013.

The objective of the external economic relations strategy is to secure the position of the Slovak Republic in international economic relations, supporting the economic development of the countryside, raising the standard of living of the population and promoting economic interests abroad, including guaranteeing fulfilment of the requirements of economic security.

The main effects of the implementation of the present strategy are to strengthen the position of the Slovak Republic as a visible and respected partner for economic cooperation, strengthening foreign economic cooperation, integration partnership and building alliances in the economic area in the context of the new medium-term strategy of the Slovak foreign policy after 2015.

On the security level, the implementation of the strategy will aim at ensuring the economic security of the Slovak Republic in particular by ensuring stable deliveries of strategic goods, which are necessary for the economy's well-being in terms of the Slovak energy security strategy. On the economic level, the strategy will contribute to building such a character of the country's external economic relations, which will contribute to increasing the level of economic development, stability of economic development and the standard of living of the population. At the political level, the strategy will be to place the Slovak Republic as a dynamic entity of the world economy and an active member of the EU and international organizations.

In the context of the above from the point of view of EU trade policy and from the point of view of the priorities of the SR, it is necessary to mention the current development of the negotiations on free trade agreements. The first bilateral Free Trade Agreements of the new generation were concluded with South Korea and were ratified by the European Parliament on 1 July 2011. The implementation of this new policy is also illustrated by the EU-Peru and Colombia multilateral trade agreement, from 2013 onwards, the EU-Singapore Free Trade Agreement negotiated in 2014 and the EU-Vietnam Free Trade Agreement negotiated at the end of 2015 as well as the Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada, which was the subject of the final procedural negotiations leading to its signature in October 2016.

While the negotiations with the United States on the Transatlantic Trade and Investment Partnership (TTIP) remain an open and well-known priority, the EU is also continuing negotiations on free trade agreements with Japan, Mercosur

and Tunisia. The European Commission, as negotiator of these agreements on behalf of the EU, is determined to step up negotiations with the Philippines, Indonesia, and with India, Australia and New Zealand in the next year.

During the negotiations about free trade agreements, besides the agricultural sector, regulated areas - especially social and environmental standards, the public services sector - and the protection of investments, sanitary and phytosanitary measures, the issue of geographical indications, and, last but not least, the overall transparency of the negotiations are sensitively perceived. In this context, it is necessary to mention the TTIP agreement, due to significant differences in EU and US regulatory regimes.

In the EU negotiations with third countries about free trade agreements, the Slovak Republic in the area of trade in agricultural and food products, on the one hand, seeks a balanced approach in the enforcement of our offensive and defensive interests. Traditional Slovak export items, for which the SR generally requires a reduction in import duties by third countries, include dairy products, isoglucose, food preparations, cereal preparations, chocolate and confectionery. On the other hand, by requiring the SR to import agricultural items, which are unable to be produced due to its geographical and climatic conditions, it has a positive approach to the liberalization of the market for imports of certain goods from third countries - especially tropical and subtropical fruit and vegetables, products of them, coffee, tea, etc.

In the negotiations with third partners, the SR also takes into account the indirect effects of liberalization - (e.g. beef, sheep meat, sugar, milk, cheese, etc.), although importing these items may not be transported directly to our market but rather to the markets of the original EU members, but it can threaten our past exports of live animals to the market of the original EU members.

4   Conclusion

Competitive and successful innovating enterprises are the necessary prerequisites for positive structural change and convergence of the Slovak economy. In the comparison with the countries of European Union, we can conclude that small and medium-sized enterprises are a very important part of the EU economy. The share of these enterprises on the job creation is more than 60 % and the share on the added value is about 50 %. The position of SMEs is significant in the Slovak economy, their share on the employment is more than 70%. On the other hand, Slovak small and medium-sized enterprises show half labour productivity in the comparison with the countries of EU, and their share of Slovakia's exports is also low (26%). Generally, in Slovakia SMEs are relatively large (in the view of the share

of employment and value added), rapidly growing (in terms of the density of new businesses) and less competitive (in the view of labour productivity) sector of the economy. In the aspect of business mentality, the Slovak economy is only slightly worse than the EU average. The main motivations that lead people to entrepreneurship in the EU and Slovakia include two economic factors: the realization of an appropriate business idea and the acquisition of the necessary financial resources.

The most significant barrier to starting a business in Slovakia is the lack of financial resources. Slovakia is relatively competitive in terms of subjective factors in setting up new businesses. On the other hand, this country is evaluated worse in the comparison with the countries of the EU in terms of objective factors (regulatory measures for business start-ups and taxation). In addition the availability of financial resources for SMEs, the deficit in tax and regulatory support for SMEs, the position of SMEs within the framework of the overall economic policy, the scope and quality of direct government support for SMEs, social and cultural standards can be considered as weaknesses of the quality of SMEs' business environment.

Acknowledgement

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INTERNATIONAL TRADE, PRODUCTION AND EXPORT OF MEXICAN BOTTLED TEQUILA

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Abstract

The production of tequila is one of the most important economic areas in Mexico. It employs more than 25 000 people and there are more than 75 000 acres of agave. The cultivation of agave provides foreign currency as well as prestige in the field of liquors. The industry penetrates market all over the world, for example the United States, Canada and the European Union as well. It is important to monitor the existing international markets as well as try to penetrate emerging Asian markets like Japan, which might be potential consumer. The main objective of the paper is to describe production of tequila, the analysis of the world export of tequila and the paper explains opportunities which industry still has in the international trade. The paper also provides information about countries where consumption of tequila is rather attractive and has increased lately like France, Germany, Spain, Chile, Japan and of course the USA.

Keywords: *production, tequila, international trade, export*

JEL Classification: *B17, Q17, Q27*

1   Introduction

Tequila is a national drink in Mexico and one the most famous drinks in the world. It has been present on international markets for years already. Production of tequila is managed under strict control of quality which makes the product more attractive. Well known Mexican tequila producers are Cuervo and Sauza who have more than 60% of control over international market. The biggest producer, however, is Jose Cuervo which has been exporting its original bottled Mexican tequila

for years. Since 1950s the state of Jalisco has produced around 98% of Mexican tequila. Tequila is being exported to more than 100 countries nowadays. A threat that export of tequila is facing is original bottling. 90% of exports are in bulk and only 10% of tequila is bottled originally in Mexico. For example, in countries like Japan, Greece or Spain an alcoholic drink called tequila is produced, however it is made of beet and honey not agave like original Mexican tequila. Mexican government and the Regional Chamber of Tequila Industry has however completed negotiations that only tequila originally and traditionally produced in Mexico can be marked with this name. Various programs like „Hecho en México" are there to supplement import and propel domestic production as well as stimulate consumption. Unfortunately, The Regional Chamber of Tequila Industry controls only 70% of the tequila export and 30% remain uncontrolled, marked as tequila without registration, patents and brand.

1.1   Economic information about Mexico

According to the **International Monetary Fund (2017)** Mexico is the 14th biggest economy in the world and the 2nd strongest economy in Latin America. It has open market economy development of which is reassured by free trade agreement with 46 countries. The economy of Mexico is, thanks to NAFTA, significantly influenced by development of the US economy as up to 78,8% of Mexican export was aimed at the USA in the first half of 2014. The USA also has almost 50% share on foreign directs investments in Mexico. Decreasing of demand from their side has therefore huge influence on a decline of overall Mexican exports and rise in unemployment in the country. Other main factors that influence the Mexican economy are the development of oil price and world economy, current situation on foreign markets, uncertainty on international financial markets, weaker internal market, implementation of saving measures, structural reforms and worsening security situation. Recently, Mexico has enforced numerous significant structural and fiscal reforms focused on growth, improving economic competition, competitiveness and transparency in public finance.

1.1.1 Competitiveness

There is no exact, universal and generally acceptable definition of competitiveness of the expression competitiveness. This expression cannot be, therefore, exactly defined. According to **Chursin** and **Makarov (2015)** the word competitiveness has its basement in the word compete. Therefore, we might say that the word competitiveness means to be able to compete on a market. **Pavlík (2004)** on the

other hand proclaims, that being competitive means to be able to provide a customer with something different than other companies.

According to **Fifeková (2006)** a source of competitiveness from the economic point of view is the level of qualitative difficulty of the economy. This enables to identify a potential for economic development and its sustainability. These qualitative changes are represented by:

- growth of the share of activities focused on research and development,
- higher qualification and employment,
- higher production,
- growing export and added value.

Gozora (2005) states that increasing competitiveness of agricultural products can be gained only while applying competitive advantages. These advantages might be concentration of soil and other production factors, applying different forms of labour organization and modern company management. By the combination of the given intensifying factors together with supporting system of the European Union and higher prices, the agricultural companies can be viable.

1.2 International Trade of Mexico

In the table 1 we can see that in 2014 export of Mexico increases by 4,6 % and by the end of 2014 it reached 294,01 bn. USD. Export in 2013 reached 380,20 bn. USD, in 2012 370,63 bn. USD. Mexico recorded a rise in import by 4,1 % and reached 295,77 bn. USD. Import in 2013 was 381,21 bn. USD, in 2012 370,75 bn. USD. The trade balance reaches positive value of 1,76 bn. USD. As for the regional structure of Mexican international trade, the significant business partners are mostly the USA, the EU (especially Germany, Spain, Italy and the Netherlands), China, Japan, Canada and South America (especially Brazil and Colombia) states **the Ministry of Foreign and European Affairs of the Slovak Republic (2018)**.

Table 1 **Trade balance of Mexico from 2009 to 2014 in bn. USD**

in bn. USD	2009	2010	2011	2012	2013	2014
Export	229,6	298,1	350,0	370,9	380,2	294,0
Import	234,4	301,5	351,2	370,6	381,2	295,8
Turnover	464,0	599,6	701,2	741,5	761,4	589,8
Balance	-4,6	-3,3	-1,2	0,3	-1	-1,8

Source: Ministry of Foreign and European Affairs, 2018.

2 Data and methodology

A significant part of the literature and information was received from the vocational literature, books and magazines and web pages as well as from the bibliography of The National Bank of External Trade (BANCOMEXT). To fulfil the main objective of the paper we used methods like induction and deduction to find out obstacles that export of Mexican bottled tequila must face.

3 Results and discussion

3.1 Description of the product

Tequila is a drink gained from the distillation of agave. The process starts when the head or pine of agave is ripe enough to be harvested which takes from 6 to 7 or 10 years. Only the heart or pines of the agave plant is used to make tequila. These pines then undergo a process of cooking and pressure and penetration of vapour and chemical processes convert complex carbohydrates into sugars. The pines are consequently shredded and milled obtaining unfermented juice (aguamiel) – must. Then the juice is transformed to alcohol by fermentation which usually takes from 7 to 12 days. In the end the product is distilled to get tequila. The majority of tequilas are distilled twice, some of them three times. Even though there are around 135 types of agave, the only type of agave which can be used for tequila production is *Tequilana Weber Azul* which is grown exclusively in the region of Tequila, state of Jalisco. That means no other country can produce original tequila. Tequila is produced in four different varieties:

- **Blanco** – product similar to water ranking among alcoholic drinks because of its volume of alcohol
- **Joven** – similar to Blanco with addition of flavour and colour
- **Reposado** – left at least for two to twelve months in French or American oak barrel which was previously used to age bourbon, to age
- **Añejo** – left at least for a year to three years in French or American oak barrel which was previously used to age bourbon, to age
- **Extra Añejo** – aged over three years, the longer the tequila ages, the more color and tannins it has

The type of barrels, their age, previous usage and whether the interior had been burnt or toasted also affect the final taste of tequila.

3.2 National market with tequila

There are over 30 million of hectares of Agave called Tequila Weber Azul with a density of approximately up to 4 000 pieces of plants per hectare which makes it more than 120 million plants in different periods of riping.

Table 2 **Participation of municipalities of the Jalisco state in production of tequila**

Municipality	%
Tequila	59
Atotonilco	12
Guadalajara	7
Zapotlanejo	9
Tototlán	4
Others	9

Source: Regional Chamber of Tequila Industry, 2018.

One litre of 51% tequila is made of 3 kilos of agave´s pines whereas 6 to 7 kilos of agave are needed for one litre of 100% tequila. Even though the production of original Mexican tequila is placed exclusively in the state of Jalisco, there are more places where original tequila is produced: Guanajuato, Michoacán, Nayarit and Tamaulipas. In the table 2 we can see the participation of individual municipalities of the Jalisco state in the process of original tequila production. From the table it is clear that the biggest volume of tequila is produced in the municipality Tequila, of the state of Jalisco.

The following table 3 shows volume of tequila production during the last 7 years, the national consumption and volume of export. As we can see from the table, the production, as well as consumption together with export has been significantly rising.

Table 3 **Volume of production, national consumption and export of original Mexican tequila in mil. litres**

Years	Production	Consumption	Export
2010	257,5	1 015,1	152,5
2011	261,1	998,4	163,9
2012	253,2	880,6	166,7
2013	226,5	756,9	172,0
2014	242,4	788,2	172,5

Years	Production	Consumption	Export
2015	228,5	788,9	182,9
2016	273,3	941,8	197,9
2017	271,4	956,1	213,3

Source: Tequila Regulatory Board, 2018.

3.3   International market

Within volume of export of the tequila we must count on a fact that most of the exported product is tequila in bulk which provokes the idea that it might contain a product that is bottled in another country, outside of Mexico. Only 10% of the export is original bottled Mexican tequila. Table 4 shows volume of export of tequila and 100% tequila from 2010 to 2017 in mil. litres.

Table 4 **Volume of export of tequila and 100% tequila from 2010 to 2017 in mil. litres**

	2010	2011	2012	2013	2014	2015	2016	2017
Tequila	107,7	105,8	138,9	127,5	138,9	119,1	128,9	120,6
100% Tequila	149,8	155,3	114,3	99,0	103,5	109,4	144,3	150,8
Total	152,5	163,9	166,7	172,0	172,5	182,9	197,9	213,3

Source: Tequila Regulatory Board, 2017.

As for tequila production it is important to mention that demand for this product is mostly out of Mexico which means that only approximately 30% of production is aimed at a domestic market and almost 70% is produced for export. The export of tequila has had a growing tendency lately because it is the most typical alcoholic drink right after beer. There are more than 100 countries where Mexico exports tequila with the USA leading the list with almost 70% of the exported volume. Other countries following the USA are Spain with 5,8%, Great Britain with 5,5%, the Netherlands 2,7%, France 2,4%, Chile 2,1%, Switzerland 1,9%, Germany 1,7%, Japan 1,6%, Belgium 1.1%, Brazil with only 1% and other countries.

Table 5 **Export of tequila to the world in mil. litres**

Country	Vol.	Country	Vol.	Country	Vol.	Country	Vol.
USA	171710464	**Peru**	352179	**Poland**	73071	**Belarus**	21233
Spain	5314371	**Bolivia**	331149	**Cyprus**	70320	**Portugal**	20836
Germany	4636013	**Ecuador**	312568	**Serbia**	69570	**Norway**	19858

Country	Vol.	Country	Vol.	Country	Vol.	Country	Vol.
France	3014047	Philippines	286036	Hungary	66936	Kenya	17046
Japan	2005669	Costa Rica	250926	Nicaragua	63127	Caiman Islands	15934
Latvia	1797570	New Zealand	227273	Nigeria	62244	Jamaica	15390
South Africa	1592116	Puerto Rico	209916	Denmark	61954	Finland	14723
Canada	1469272	Lithuania	188940	Hong Kong	60436	Mauritius	11456
UK	1444625	El Salvador	188762	Suriname	60243	British Virgin Islands	10318
Singapore	1287661	Guatemala	186522	Sweden	58125	Bermuda	9907
Colombia	1150056	Taiwan	175831	Estonia	54819	Croatia	9193
Italy	1071345	Paraguay	156449	Qatar	54485	Slovakia	9122
Mexico	1028409	Israel	141062	India	51239	Morocco	7003
Australia	1010748	Vietnam	140394	Bahamas	47750	Bahrein	5796
Brazil	855912	Cuba	136390	Austria	45836	Venezuela	5215
Turkey	696970	Argentina	130785	Aruba	45192	Sri Lanka	2178
China	681959	Honduras	125382	Luxembourg	40319	Barbados	1778
UAE	654637	Dominican Republic	120654	Ukraine	40066	Andorra	1552
Greece	638004	Switzerland	112307	Thailand	38802	Belize	391
Panama	589180	Uruguay	92127	Slovenia	33717	Maldives	29
Chile	532866	Georgia	86967	Malaysia	33511		
Belgium	510883	Czech	84308	Romania	31593		
Russia	507869	Bulgaria	83707	Indonesia	28233		
South Korea	418475	Ireland	79951	Trinidad & Tobago	22660		
Netherlands	374432	Lebanon	79582	Ghana	21361		

Source: Tequila Regulatory Board, 2017.

3.4 Opportunities of tequila export

As mentioned above, tequila is a national alcoholic drink, produced in the state of Jalisco, holds brand of origin and therefore cannot be produced anywhere else.

The brand of origin has been already accepted by numerous countries including the USA, Canada as well as the European Union which enables Mexico to control the national image of their traditional drink. It is thus very important to take advantage of the brand of origin of this Mexican product and penetrate European countries like Belgium, the Netherlands, Italy as well as many Asian countries like Japan, China as emerging markets, for example.

4   Conclusion

Production as well as export of Mexican tequila has had a growing tendency lately. Approximately 90% of the export is tequila in bulk and only approximately 10% is original bottled Mexican tequila. Fortunately, it is a national drink with a brand of origin and therefore is exclusively produces only in Mexico. Any other similar drink cannot hold the name tequila. On the other hand, in Mexico there is a problem to overcome, i.e. there are products that do not meet the conditions of quality. There are two basic types of acceptable tequila: "unnamed" tequila which should contain at least 51% of agave and 49% of other sugars and the 100% tequila made exclusively from agave. Of course, it is important to mention that Regional Chamber of Tequila Industry is doing its best to prevent the obstacle and supervises products from the plant to materials used. The process of control is complicated, though. The product of tequila must undergo series of laboratory tests to prove whether the product really comes from the exclusive part of the state of Jalisco where original Mexican tequila is produced and then they might be able to state whether the product contains agave but they can hardly assume the percentage of agave in it.

In the recent years the image of tequila and its consumption has been radically changing. In the 1970s tequila was mostly a drink for young rebelling people. Nowadays it is changing into a drink with high quality compared to cognac and should be consumed slowly, enjoying every sip, preferably without a lemon or a lime and salt.

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FOOD SECURITY AND THE DIRECTIONS OF AGRARIAN POLICY IN AZERBAIJAN

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Abstract

In the article, the necessity of paying attention to food security in the world, including Azerbaijan, the employment of people in the agrarian sphere and the improvement of living standards are investigated. It is believed that establishment of a network of agricultural co-operatives within the framework of sustainable agriculture development and food security policy in Azerbaijan should be one of the priorities in supporting agricultural integration with industry. The essence of food security, to use internal source of stock in agrarian sphere and the role of economic mechanism are investigated. In article the author offers the structure of sowing area, production and conversion technology, to improve the infra-structure, the formation of seed-growing and breeder, the development of cattle-breeding and provision of them with feed, to improve technical provision of agrarian sphere, to improve management mechanism in order to discover internal stocks. In this connection, to be supported local production, to raise competition ability of the product, to reduce prime cost of the product, marketing, credit, cost, investment and to use other economic mechanisms are estimated as priority directions.

The article concludes that the implementation of the measures will be based on high technological development in the post-2025 period, with the competitiveness of the economy based on the efficient structure of the agrarian economy, the 61st for food supply in Azerbaijan's Global Food Security Index, 86th for quality of food products, and may reach the 40th position on both indicators.

Keywords: *agrarian sphere, economic mechanism, food security, priority directions, seed – growing.*

JEL Classification: *Q11, Q18, F42 , I 31*

1   Introduction

The problem of hunger and not to eat one's fill has been pursued throughout history. In this regard, food security was associated with the population living at different levels and conditions. Food security is a matter of food insecurity. The British economist, Thomas Robert Malthus (1766-1834), in his work "Experience in the Population Law" in 1798, showed that living means for population can not increase being in numerical range though the number of people increased by 2 times (in geometric range) in every 25 years. Thus, he considered the deficit of foodstuffs to be natural. With regard to population growth, Malthus considered illnesses, defects, and wars as legitimate due to food shortages. While Malthus's ideas did not fully comply, in any case, to use of natural resources rationally, making changes in the structure of agriculture, conducting reforms, introducing new policies on population growth in some countries and increased responsibility for such problems. During the globalization and development of international relations, this problem is more vivid. The problem of food security at different levels: global, national, regional and household, and its solution is complicated by the solution of economic and social problems.

1.1 Policy directions of food security

In the 20-30s of the last century, the concept of national security was considered as a mutual relationship of prosperity, political stability and defense of the state. Even the last priority was value. The discussion of the food security problem occurred after the post-war era, when the Universal Declaration of Human Rights (1948) was adopted. However, in 1974, the UN General Assembly adopted a resolution entitled "International Obligations on Food Security in the World" prepared on the recommendation of FAO.Here, food security was described as "a guarantee that all residents can meet the demand for world food resources at any time for active living conditions." In 1992, at the conference held in Rio de Janeiro, the UN, a Sustainable Development Concept encompassing economic, social and aspects was adopted. According to the decision, this concept was adopted as a general action plan of the twenty-first century for all UN member states. Though, sustainable development is interpreted in various scientific disciplines, it forms a new form of economic development and human capital management, which is essentially the essence of which is capable of meeting people's demands and does not prevent them from meeting their future needs. These requirements are considered as essential conditions for the provision of food for the people, with the creation of a favorable socio-economic environment for everyone. In

sustainable development, everything must only answer for human development and serve as a background for it. [1, p.134-138]

In modern conditions, the result of international attention to the food problem is that "the Rome Declaration on World Food Security" has adopted in the United Nations initiative in 1996. The main reason for the adoption of the Rome Declaration is the rapid increase of people who are hungry and don't eat their fill in the world. This world-wide trend, especially political tension and economic downturn, is more prominent in Asia and Africa. The Rome Declaration dwelled on the reduction of the number of abused consumers up to 2 times and improving the food supply of the community members. [6, p.165]

For the period 2016-2025, the United Nations has set goals for the elimination of hunger and malnutrition with its member states and has carried out measures in this direction. As a result of efforts to improve food security and nutrition, this figure dropped to 815 million in 2016, from 900 million people suffering from chronic hunger in 2000. The increase of 38 million has been observed compared to 2015. This increase in one year is no longer a danger signal. People suffering from chronic hunger are mostly from Tropical Africa (sub-Saharan Africa), Southeast Asia and Western Asia. In this regard, FAO calls on all countries to "end hunger, to achieve food security, to develop nutrition and to create a sustainable agricultural system," in the second phase of sustainable development, until 2030. [5, p.2-3]

1.2 Global food security and measures taken in the agrarian sector

According to FAO estimates, the volume of production by 2025 should be increased by 2 times in order to provide the population with food products (with relevant standards). This is not so real. According to some economic calculations, food production will change in the increasing direction, even by the year 2030. But in exchange for current nutritional norms and population growth, in the world market 500 million ton grain,40 million tons meat, 70 mln. tons of fish and fish products and some other products will not be available.The world population is expected to reach 9.0 billion by 2050. There is a need to think about the state of food systems in order to make sure that there is enough food for everyone. There is a need to reduce the impact of food systems on the environment. Because, today, as a result of food production, a large number of greenhouse gases are released into the atmosphere, tension in water resources is being created. It should be a deeper understanding of how food procurement options affect poorer farmers in other parts of the world. The ways of preventing food loss at home

and super-markets, storage, transportation of food chain should be learned. The root causes of insufficient nutrition are more complicated and include a broader economic, social, political, cultural and physical environment. From this point of view, addressing the problem of non-nutrition requires a combination of activities and additional interventions in the agricultural and food systems, natural resource management, public health and education.

As the majority of the population of developing countries are engaged in the agrarian sector, that's why, the problem is calving of poor villagers' lands. In most developing countries, land plots are simply not used. The fact is that those lands are privately owned by the latter, who are not interested in the issue of their agricultural circulation - latifundists, tribal leaders, large agro-companies, officers and officials of authoritarian regimes. Such situation once again proves the necessity of major social changes, including a truly democratic land reform. It is not coincidence that in more than 50 developing countries with an overall population of 1.4 billion, there is an absolute decline in food supply.

On the world scale, 244 million people have been migrated in 2015. Compared to 2000, it has increased by 40%. About 150 million migrants are migranted as workers. Most migrant populations are migranted who moved from villages. The reason is that the socio-economic situation in the villages is inadequate. Research shows that 75% of the poorest and least food-rich population in the world are concentrated in the villages. Problems faced by the rural population should be solved by state and international organizations. They should be provided with credit, tax breaks, technology and facilities and it should be helped in order to form the food market. Otherwise, it will not be possible, to prevent this migration flow. [8, p.6-8]

The international dimension of the problem of food security is particularly evident in the background of globalization. Therefore, international organizations, such as the International Bank for Reconstruction and Development, the European Bank for Reconstruction and Development, the International Monetary Fund and others, have recently begun to play an active role in resolving this urgent problem.

In the solution of the problem the grain farm is one of the main places. This farm plays a coordinating role for the other sectors of the agrarian one. The state of grain production and its position in the grain market are perceived internationally as a key indicator of the food security of individual countries. From the point of view of socio-economic importance of grain production to the country, reliable bread and bakery products, as important as the product of daily consumption, draws attention to the fact that food is a product. Grain and its processing products form the basis of human life activity.

If there is a part of import in the average incomes of each person of population as the main indicators of food security, the temporary remainder of food grain (60-daily stock of grains or 17-20% of total volume annual consumption), food resources , now these criteria have expanded and become more sophisticated . This includes the followings: - specific weight of part of food expenditures in total expenditure of individual population groups; - Possibility of Territorial access to food (measured by comparing the retail price of the same goods in different regions of the country); - level of food "comfort" (consumption share of modern types of food that reduces household savings and saves time); - the level of "nature" and quality of the product; - the impact of the quality of the product on the health and life expectancy (also the products received with the help of engineering genetics and biotechnological methods, which began mass commercial commercialization since 1995); The main criterion of food safety of population is characteristic with creation of 75-80% of total main food products volume by national commodity producers and being below 3300 kcal a day of recommended caloric of biological excellent products consumed by population. [6, p.156-206]

As the main guarantee of population's food security is the agrarian sector. Therefore, the state's attention to the center of the problem's solution is absolute. Developed countries are well aware of their experience that, with many specific conditions, agriculture is not competitive in comparison with other sectors of the economy. On the basis of this, they constantly increase state support for the area. Statistics show that the support costs for farmers in Europe are 40% of the cost of production. Specifically, the share of state subsidies in the agrarian sector is 30% in the United States, 45% in Canada, 66% in Japan, 59% in Sweden, 71% in Finland, and 77% in Norway. It should be noted that in these countries, the agrarian sector is supported not only with subsidies, but also with comprehensive institutional tools and mechanisms. [5]

One of the ways to ensure sustainable development in agriculture is to develop biotechnology in the agrarian sector. Over the last 200 years, many experiments have been conducted on hybridization of plants and seeds around the world. In the 1960s, the New Revolution, the Green Revolution, created a major turning point in agriculture. In the developing and developing countries, the Green Revolution rapidly expanded its production, the country's economy began to grow by it. Food problems have begun to decline in countries suffering from starvation as a result of genetically modified products such as soybeans, corn. [3, p.2-4]

From world experience it seems that it is necessary to organize global management in this area in order to provide food and nutrition and to develop agriculture in any country. According to Joachim von Braun and Regina Birner, there are five major mechanisms of global governance: firstly, formulating of global

objectives, then to sign compulsary contracts at internationally mandated and get voluntary agreements, establishing organizations at global level, and adopting new standards and specific commitments in this area [11, p.269]

At present, food security is one of the key elements of economic security, which is the basis of the national security of each country. Thus, global food security requires further strengthening of economic measures in the agrarian sector.

1.3 Food security and economic mechanisms of independent Azerbaijan

There was a real threat to Azerbaijan's food supply during the years of independence and reforms. Distributed trade relations led not only to the decline in production and consumption across Azerbaijan, but also to dependence on strong imports from other countries and to ever-increasing foreign trade debt. During this period, the development and application of relevant normative legal documents, projects and programs in public policy was of particular importance.

From this point of view, provision of food security requires from the state a comprehensive implementation of political, socio-economic, scientific-technical, organizational, information and other measures. The crucial role in ensuring food security is to protect the domestic food market and the economic interests of domestic commodity producers from unfavorable competition: 1) increase in real income of the population and increase their livelihoods; 2) Strengthening the agrarian sector in the country's economy; 3) Measures aimed at effective management of agricultural products, commodities and foodstuffs abroad, in particular for their internal market protection. From this point of view, it is impossible without sustainable activity of agrarian production and food market in the safe protection of population's food security.) Thus, food security stipulated the state's food independence being an important factor of political and economic independence of the country. The achievement of food independence by the state directly depends on the regulation of the agrarian sector.

Therefore, in order to ensure the effective functioning of food security, the state pays special attention to its regulation by means of economic and administrative mechanisms. In the conditions of market relations, the economic methods of state regulation are more preferable. These mechanisms include price, finance, credit, budget, tax, planning, customs, insurance, and the like.

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The main task of the state in the agrarian sector is to meet the demand of the country's population for food products mainly from local production. In this regard, it is advisable to approach the agrarian sector in terms of ensuring food security.

Table 1 **The production and consumption, import and export by main types of products in Azerbaijan**

	2010	2013	2014	2015	2016
Stock of wheat (ton) at the beginning of year	901740	1067576	1229652	856804	875248
production	1272340	1841307	1407405	1639830	1799859
import	1330017	1451257	1195656	1353072	1599599
Total of resources	3504097	4360140	3832713	3849706	4274706
Export	-	-	-	-	-
Consumption	2754534	3130488	2975909	2974458	3249075
Stock at the end of year	749563	1229652	856804	875248	1025631
Total of utilization	3504097	4360140	3832713	3849706	4274706
Stock of potatoes (ton) at the beginning of year	590617	553153	580842	541666	534264
production	953710	992780	819319	839795	902396
import	64998	78054	143634	139239	191204
Total of resources	1609325	1623987	1543795	1520700	1627864
Export	69853	53942	49476	36713	38248
Consumption	987270	989203	952653	949723	997364
Stock at the end of year	552202	580842	541666	534264	592252
Total of utilization	1609325	1623987	1543795	1520700	1627864
Stock of all types of cattle and poultry meat (ton) at the beginning of year	8858	9998	9896	9279	4139
production	244897	286879	291189	298613	302227
import	36019	25144	25418	17567	41719
Total of resources	289774	322021	326503	325459	348085
Export	1519	1581	1387	831	134

	2010	2013	2014	2015	2016
Consumption	279225	310544	315837	320489	343706
Stock at the end of year	9030	9896	9279	4139	4245
Total of utilization	289774	322021	326503	325459	348085
Stock of milk and dairy products (ton) at the beginning of year	172641	152313	158195	164815	22115
production	1535753	1796706	1855838	1924542	2009913
import	647229	573587	581753	366035	288488
Total of resources	2355623	2522606	2595786	2455392	2320516
Export	-	6072	6019	6262	5753
Consumption	2184035	2258339	2424952	2427015	2309849
Stock at the end of year	171588	158195	164815	22115	4914
Total of utilization	2355623	2522606	2595786	2455392	2320516

Source: Statistical yearbook of Azerbaijan. 2017. State statistical commitee of the republic of Azerbaijan. Baku. 814 page [9, p. 504-506].

The provision of Azerbaijan's food security can be achieved by state regulation that does not contradict international trade in credit, taxes, insurance, pricing, planning, management, stimulation, food resources formation, socio-economic policy, in the sphere of protection of the environment and land resources. Improving the economic mechanism being an important factor in the increase and expansion of production, require the seasonality of jobs in agriculture, dependence on external factors, and the input of production in the production.

As a result of effective measures undertaken in the early years of independence, in our Republic, though production of agricultural products has been continuously developing every year,there were difficulties in meeting normally the population's demand for many basic products, including grain, eggs, vegetable oil and other products. Taking this into account, with that end in view, 100 million manats (55-60 million dollars) has been taken from the state budget by the Presidential Decree of August 25, 2008, after approved the "State Program on Reliable Provision of Foodstuffs in the Republic of Azerbaijan for 2008-2015".

"The State Program on Socio-Economic Development of the Regions of the Azerbaijan Republic (2004-2008)" approved by the Decree of the President of the Republic of Azerbaijan on February 11, 2004, On April 14, 2009 "Socio-Economic Development State Program of Azerbaijan's regions in 2009-2013", February 27, 2014," State Program on Socio-Economic Development of the regions of the

Republic of Azerbaijan for 2014-2018 "was identified as one of the main priorities of the country's agricultural development. [4, p.57-58]

State programs have led to the sustainable development of the regions and the creation of infrastructure for radical reforms in the agrarian sector in order to provide the population with essential foodstuffs and industry raw materials in the Republic of Azerbaijan. Extensive technical and financial support by the state to agricultural producers and processing facilities plays an important role in the development of the agrarian sector. The measures taken in the field of state regulation have contributed to the development of agriculture, entrepreneurship, increased production of agricultural products, increased production in the country's domestic consumer market and significantly improved the demand of the population.In accordance with the decree of the President of the Republic of Azerbaijan, "On state support for agricultural products producers" dated January 23, 2007, paying an average of 50 per cent of the cost of fuels, motor oils and mineral fertilizers by the state has given a strong boost to agricultural production. It is envisaged to increase the amount of assistance 25 percent provided by the Decree of 15 April 2015, and the subsidy given for the sale of mineral fertilizers for recycling (interim) seedlings.As a result of consistent measures, in 2015 compared in 2005 grain production increased by 41.1%, potatoes by 40.1%, vegetables by 13.1%, melons by 33.2%, fruits and berries by 41.9%, grapes 97, 1 percent increase. During the comparable period meat production increased by 50.8 percent, milk production by 53.7 percent, eggs production by 77.5 percent, wool production by 29.7 percent, and the total product of agricultural increased by three times. [2]

At present, agrarian policy in Azerbaijan has been directed to the implementation of complex measures aimed at dynamic development of production. Therefore, one of the main goals is to achieve sustainable development of the non-oil sector, stable macroeconomic situation of the country, efficient regulation of the economy and stimulation of its dynamic development. For the purpose of it,it is planned to expand production, to create a competitive economy, infrastructure, favorable investment environment and to increase the share of domestic resources in the country in investments involving to the economy. At the same time, to increase direct subsidies for agriculture, attraction of investments to the establishment of processing facilities, and implementing of the development of non-oil fields are considered as priority directions.

The President of the Republic of Azerbaijan I.Aliyev said that great work has been done in the sphere of entrepreneurship development and food security in Republic at the conference dedicated to the results of the second year of implementation of "the State Program on Socio-Economic Development of Regions

for 2014-2018". In Azerbaijan per capita is 0.55 hectares of land suitable for agriculture. It was noted that we provide us with 64 percent of grain, 90 percent for potatoes, 100 percent for melons, 110 percent for fruits and berries, 92 percent for meat, 80 percent for milk and 99.6 percent for eggs.The President of the country has shown specific facts to reduce the level of self-sufficiency in basic food products and the dependence on imports of raw material, and has identified trends to reduce this dependence. President I.Aliyev noted that "Now we have been able to provide us a great deal of self-sufficiency. Because the policy of diversifying the country's economy is being successfully implemented. However, at the same time ... there are still many things to make ... a key document for businessmen, government agencies and local authorities - a road map must be and we must do it soon. " (Republic Newspaper, 27.01.2016).

The dynamics of agricultural products of Azerbaijan are differ related to changes in production rate. İt means associated with decreasing producer prices of some products it is observed sudden increase in other products prices. We can see it from the table given below.

Table 2 **Producer price index of agricultural products (as per cent to previous year)**

	2010	2013	2014	2015	2016
Agriculture products	104.2	103.2	102.3	101.2	97.4
Annual plants - total	104.5	103.6	102.8	97.2	87.4
Cereals (except rice) , leguminous crops and oil Seeds - total	103.2	104.2	102.5	100.2	90.0
Wheat	104.1	106.6	101.4	96.7	84.2
maize	110.8	96.3	96.6	105.9	101.0
Vegetables	96.8	101.5	102.2	98.2	96.2
Water-melon and melon	92.7	99.6	78.9	88.1	66.5
potatoes	109.2	95.0	106.8	103.5	100.7
crude cotton	112.1	99.4	100.0	100.0	100.4
Prennial plants – total	102.1	98.2	96.3	114.6	102.0
Vineyard	97.6	91.3	101.8	106.3	92.8
Subtropical fruits	99.2	105.3	103.4	121.7	106.6
Seedy and stone fruits Other fruit trees, bush fruits and walnut,	101.5	95.4	83.2	99.3	97.7
hazelnut	110.6	94.7	106.5	131.9	120.4

	2010	2013	2014	2015	2016
Cattle breeding products – total	104.4	103.7	103.0	101.0	103.4
Cattle and their calves (production) – total	103.2	101.6	100.9	101.4	101.0
Beef (in live weight)	100.3	106.3	98.7	98.2	102.0
Raw milk from cattle	103.5	99.2	101.6	101.3	100.6
Poultry and their eggs – total	108.9	111.2	109.0	105.7	117.0
Fowl (in live weight)	102.1	104.1	103.1	105.4	108.7

Source: Statistical yearbook of Azerbaijan. 2017. State statistical commitee of the republic of Azerbaijan. Baku. 814 page [9, p. 425-426].

From the table it can be seen that, increased production of plant products affects producer prices. However because of the high cost of imported technical material (machinery, device, equipment, fertilizer, etc.) of raw material's also affects the producer's price.

Connected with it, "Strategy Roadmap for the National Economic Outlook of the Republic of Azerbaijan" was prepared and approved by the Decree of December 6, 2016,in accordance with the Decree of the President of the Republic of Azerbaijan dated March 16, 2016,. The Strategic Roadmap covers the economic development strategy and action plan by 2020, a long-term vision for the period up to 2025 and target views for the period from 2025. Major changes and challenges that may occur in economic, social, demographic, natural and technological fields in the post-2025 period will be taken into account in order to ensure the country's food security. Expansion of the application of new food chain technologies for the formation of adequate food security systems (increasing the level of use of biotechnology and nanotechnology, increasing food production by using of other production technologies, medicalization of nutrition and the creation of new food types) and the formation of new agro-food chain structures (expansion of organic production,formation of regional, local and alternative food chains, reduction of food chain waste and expanding of recycling opportunities) are intented to formate the system of adequate food security. [10, p.49]

The researches show that priority directions in the agrarian field consist of provision of using land and water resources efficiently; rehabilitation of irrigation and melioration in agriculture; to support relating development of production of raw material and treatment spheres in the agrarian sector; stimulation of increase of production of competitive products;to improve the financial status of agrarian production and service sectors; improvement of the scientific and methodological support of the agrarian sector and personnel training system, etc.

At the same time, the level of food security requires improvement of planting structure, development of cattle-breeding and provision of them with feeding, production and processing technology, improvement of infrastructure, organization of seeding and breeding, improvement of technical support of the agrarian sector, improvement of management mechanisms. Establishment of a network of agricultural co-operatives within the policy of sustainable farming development and food security policy in Azerbaijan should be one of the priorities of supporting industry and agricultural integration.

2   Data and Methods

Information related to food security and agrarian policy has been taken from FAO reports, Statistical yearbook of State statistical commitee of the Republic of Azerbaijan for 2017, the State Programs on Socio-Economic Development of Regions, from international articles in journals, magazines, and newspapers, and scientific researches of Azerbaijan and foreign scholars. Essays, dissertations and books related with article were analyzed as well. Moreover to conduct an in-depth study were used analysis, induction, deduction, economic - statistical and other methods.

3   Result and Discussion

As a result of the generalization, we come to the conclusion that in the market economy, the following issues must be solved by approaching to the improvement of the economic mechanism of food security with a comprehensive and systematic:
– Local producers should be supported by all means. Attention should be increased to the quality of agricultural products;
– The level of provision of food security is rising as the production of basic agricultural products increases in the country. The state must achieve such the development of local agrarian production that even though the external environment may deteriorate, but the population's food consumption is not threatened;
– Growth trends in the structure of food products in our republic should be adequately intented in the increasing impact of urbanization and environmental factors; ecological regulation of economic activity in agrarian sphere should take place in the background of the involvement of various financial sources;
– The competitiveness of domestic products should be increased, the product cost should be reduced, the marketing and information services sould be expanded, a state investment policy should be carried out that promotes the

development of leasing and infrastructure in order to improve the economic
mechanism of food security;

– Measures of creating a favorable economic environment,modernization of tech-
nical means complex in all levels of delivering food products to the final con-
sumer should be carried out for the application of resource-saving technologies
that keep quality in the production, processing and storage of food products;

– Local stimulation measures should be carried out to regulate imports and ex-
ports of agricultural products.

4   Conclusion

Thus, an active regulatory policy should be implemented in different sectors of
the economy, and should be used more flexibly in terms of finance, credit, tax,
price, investment, insurance and other means in order to ensure food security
in Azerbaijan. This is connected with the fact that, as noted at the conference
held on February 5, 2014 by President Ilham Aliyev, "... strengthening of domestic
production, reducing of dependence on imports and raising of export-oriented
products is a priority ... Food security in Azerbaijan should be ensured by 100%
inner production. As one of the development directions of the agrarian sector, to
develop the agrarian tourism in rural areas in order to ensure rural development
and employment, and to stimulate ecological organic agricultural products along
with the production of traditional agricultural products should be intented. The
implementation of the measures will be based on high technological develop-
ment in the post-2025 period, with the competitiveness of the economy based on
the efficient structure of the agrarian economy, the 61st for food supply in Azer-
baijan's Global Food Security Index, 86th for quality of food products, and may
reach the 40th position on both indicators.

Acknowledgements

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AGRICULTURAL FOOD SYSTEMS AND THEIR ROLE AT INCREASING FOOD SECURITY AND NUTRITION

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Abstract

The submitted scientific paper deals with agricultural food systems and food security and nutrition in the world and European Union. The objective of this paper is to analyse agricultural food systems and their role at increasing food security and nutrition, food supply chain, food losses and land degradation. Data are gained from authors own research and other data were obtained from FAO and OECD. In 2017, 815 million people have been undernourished in the world. Economic growth alone will be not enough to end hunger and malnutrition. Nutrition has to be set as an explicit objective in coherent and cross-sectoral strategies, policies and programmes. The high level of EU food safety and nutrition can be achieved if cross-cutting policy measures are vital for the future EU food safety and nutrition, international food chain governance should be consistently advanced.

Keywords: *agriculture, food security, food system, food supply chain, nutrition*

JEL Classification: *O13, Q18*

1   Introduction

Economic growth alone will be not enough to end hunger and malnutrition. Nutrition has to be set as an explicit objective in coherent and cross-sectoral strategies, policies and programmes. In this context the politicians, scientists, NGOs, non/profit organizations have to analyze that how food system influences people's choices and nutritional status. There is unavoidable radical transformation

and effective policies with programmes, in order to create the potential to shape more sustainable food systems contributing to the progressive realization of the right to adequate food.

Food quality describes the attributes of a food that influence its value and that make it acceptable or desirable for the consumer (FAO/WHO, 2003). This includes: size, shape, colour, texture, flavour, food composition (ingredients and nutrients), as well as the way how food is produced or processed (Floros et al., 2010; Grunert, 2005). This includes negative attributes such as spoilage, contamination with filth, discolouration, off-odours and positive attributes such as the origin, colour, flavour, texture and processing method of the food (Giusti & Bignetti & Cannella, 2008). Food safety describes the impact of food on human health, and refers to "all those hazards, whether chronic or acute, that may make food injurious to the health of the consumer" (FAO/WHO, 2003).

Malnutrition in all its forms (undernutrition, micronutrient deficiencies, overweight and obesity) still affects every country on the planet and is a major impediment to achieving both global food security and adequate nutrition, and sustainable development. Urgent actions are needed, delivered via bold policies, initiatives and investments. According to HLPE (2017) currently around 0.8 billion people are still hungry, more than 2 billion are deficient in essential vitamins or minerals, and around 1.9 billion adults experience overweight and obesity. While hunger have declined over the past decades, overweight and obesity are rapidly increasing all over the world.

Prevalence of undernourishment is an indicator that has been used by FAO since 1974 to measure hunger and food insecurity. Calculated using national-level food balance sheets and information on the distribution of food consumption from surveys, this indicator estimates the number of people whose food consumption is insufficient to meet dietary energy needs for an active and healthy life. While it has been an important metric for tracking national and regional trends in the proportion of people suffering from hunger, it does not offer details on the access to food at the household or individual levels (Ballard & Kepple & Cafiero, 2013). Neither does it provide information about the nutritional value of available food or the quality of diets.

2   Data and Methodology

The main objective of this paper is to analyse agricultural food systems and their role at increasing food security and nutrition.

The data was gathered from own authors' research and other secondary data taken from FAO. These databases are focused mainly on food systems types, food supply chain, food loses and land degradation.

Scientific methods such as analysis, synthesis, comparison, and scientific compilation were used. The scientific compilation is a creative compilation, and in its use the work brings extended knowledge. The substance of the work consists in gathering, arranging, and interpreting databases of international organizations with own approach to their processing and interpretation.

3 Results

3.1 Challenges of the Agriculture and Food Production

Today, in the world, 1 person in 3 is malnourished and 1 in 2 could be malnourished by 2030, if nothing is done. According to FAO in 2017-815 million people are undernourished.

The current trends and challenges are reflected in 17 sustainable development goals for the next 15 years with aim to balance economic, environmental, and social issues. The sustainable development goals are linked to FAO Strategic Objectives: eliminate hunger, food insecurity and malnutrition, to ensure productive and sustainable agriculture, forestry and fisheries, to reduce rural poverty, and to create inclusive and efficient agricultural and food systems, as well as to increase the resilience of livelihoods to disasters.

3.2 Food System Types and their Food Supply Chains and Food Environments

3.2.1 Food supply chain

The food supply chain consists of the activities and actors that take food from production to consumption and to the disposal of its waste (Hawkes & Ruel, 2012). The steps of the food supply chain include: production; storage and distribution; processing and packaging; retail and markets.

The decisions made by one group of actors at one stage of the chain have implications for the others (HLPE, 2014). These decisions influence the way food is produced and processed along the supply chain (Downs & Fanzo, 2016) and impact the four dimensions of FSN (availability; access, whether physical or economic; utilization; and stability), as well as the nutritional value of the food produced and processed.

Food supply chains can increase the nutritional value of food, by increasing access to macronutrients as well as micronutrients, for instance through biofortification, food fortification or improved storage of perishable foods (such as fruits and vegetables), or by reducing, in food formulation, the levels of substances associated with diet-related non-communicable diseases. However, the nutritional value of food can also diminish along the food supply chain.

3.2.2 Food system types

States should, in collaboration with affected stakeholders, recognize the diversity of food systems (traditional, mixed, modern) and design context-specific policies and programmes that support the co-existence of diverse food systems and diets, integrate a nutrition-focused food system approach into national development, health and economic plans and facilitate an inclusive dialogue and develop nutrition strategies at national and local levels, which focus on improving food environments.

Also is necessary to improve food and nutrition literacy throughout society through popular education programmes and other appropriate schemes, improve capacity by investing in a workforce of nutrition practitioners, and by educating a new generation of food system professionals on nutrition (HLPE, 2017).

Food supply chains consist of production (availability), storage and distribution, processing and packaging, retail and markets.

Production in traditional food systems - food is mainly produced by smallholders in the area and most of the foods available are local and seasonal. In mixed food systems, food production takes place at both local smallholder farms and larger farms that are farther away. There is greater access to foods outside their typical season. In modern food systems a wide array of foods is produced at farms ranging from small to industrial in size. Production is global, so foods are available from anywhere and at any time.

Storage and distribution in traditional food systems - lack of adequate roads makes transporting food difficult and slow, leading to food waste. Poor storage facilities and lack of cold storage makes storing food, especially perishables, difficult and leads to food safety concerns and waste. In mixed food systems, there are improvements in infrastructure with better roads, storage facilities and increased access to cold storage; however, these are usually not equally accessible, especially for the rural poor. In modern food systems, modern roads, storage facilities and cold storage make it easy to transport food on long distances and store it safely for long periods of time.

Processing and packaging in traditional food systems - basic processing is available such as drying fruit, milling flour or processing dairy, little or

limited packaging occurs. In mixed food systems, highly-processed packaged foods emerge and are more accessible. These extend the shelf life of foods. In modern food systems, many processed packaged foods are easily available, often cheap and convenient to eat, but sometimes "unhealthy".

Retail and markets in traditional food systems - low diversity and density of food retail options leads to a heavy reliance on informal kiosks and wet markets. In mixed food systems are greater diversity of both informal and formal bodegas, corner stores and markets. More access to meals eaten outside the home including street food and fast food. In modern food systems, high diversity and density of "food entry points" including all of the options in the other systems as well as larger super and hypermarkets, fast casual food and fine dining restaurants.

3.3   Outcomes of diets

Food systems, through diets, give rise to a variety of outcomes. These relate not only to nutrition and health, but also to all the dimensions of sustainability, which in turn link back to the food system drivers.

3.3.1 Nutrition and health outcomes

Healthy diets are essential to prevent malnutrition in all its forms (undernutrition, micronutrient deficiencies, overweight and obesity). These multiple burdens of malnutrition lead to health problems such as underweight and stunting and to diet-related NCDs such as diabetes, coronary heart disease, cancer and stroke (WCRF/AICR, 2007; Hawkesworth & Dangour & Johnston & Lock & Poole & Rushton & Uauy & Waage, 2010).

3.3.2 Economic outcomes

Agriculture and food production provide income and employment for millions of people, particularly smallholders and poor people in rural areas (HLPE, 2013). Agriculture alone is estimated to provide employment to 1.3 billion people worldwide, 97 percent of them living in developing countries (IBRD/World Bank, 2007). However, unhealthy diets and malnutrition hamper economic growth and perpetuate poverty via three main routes: direct losses in productivity from poor physical status; indirect losses from poor cognitive function and deficits in schooling; and losses owing to increased health care costs. Consumption patterns can also have positive economic impacts, for instance through the reduction in food losses and waste (HLPE, 2014).

3.4   Land degradation

Despite the fact that the ECA region is well-endowed with land resources, many countries are experiencing an increase in degradation, depletion and overexploitation, which is undermining the sustainability of their production systems (FAO, 2016). Recent, rapid changes in land cover and land use have created major challenges to traditional landscapes and land use systems, magnifying land degradation processes and impacts. This trend is especially important for achieving SDG2 targets centred on sustainable agriculture. Land degradation not only reduces productive capacity of land, but also decreases ecosystem functions, thereby reducing resilience and limiting ability to adapt to future extreme weather events that may occur as a result of climate change. Land degradation constitutes a major development challenge for countries, negatively impacting their food security, ecosystem services and rural livelihoods.

According to FAO (2017), overall, in the EU-28, EFTA and European CIS countries (except the Russian Federation), water erosion is threatening approximately 16 percent of total land, while wind erosion is impacting 6 percent. It is also estimated that 45 percent of soil in the EU-28 countries has low organic content. Soil sealing has a negative impact on approximately half of the land under agriculture within the EU-28 countries. It is predicted that climate change will further exacerbate these issues, worsening soil degradation and leading to further desertification.

Figure 1 **Population living on degraded land, % of total population in 2010**
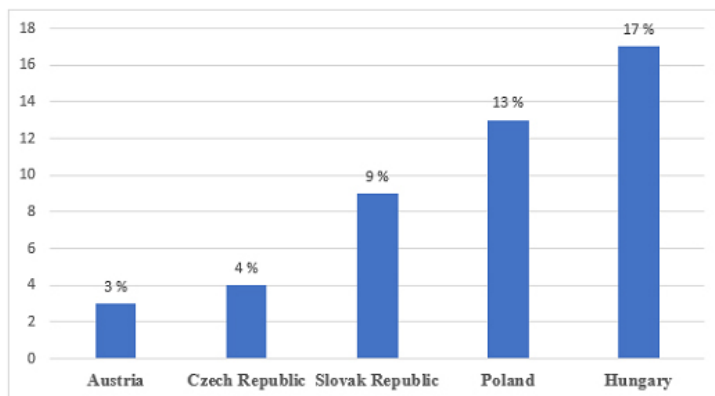
Source: UNDP

Soil erosion rates for arable land in the EU-28 countries indicate that the issue is most acute in the Southern and Central EU countries, with Italy being the worst

affected, followed by Croatia, Greece, Portugal, Slovakia, Slovenia and Spain. In the North and North-East of Europe, the soil loss rate is still relatively low, especially in countries such as Estonia, Finland, Ireland, Latvia, Lithuania, the Netherlands, Sweden and the United Kingdom of Great Britain and Northern Ireland. In larger EU countries, including Germany, France, Poland and Romania, the southern territories are typically more exposed to soil losses than the northern ones. From V4 countries the best situation is in Czech Republic, where only 4 % of population living on degraded land. In Slovakia, 9 % population was living on degraded land in 2010. The worst situation is in Hungary- 17 % population (figure 1).

For example, in the EU-28, a framework of objectives related to land take and land degradation has been established via a series of policy documents. Their key elements include: (1) progress towards the target of 'no net land take by 2050; (2) reducing soil erosion; (3) increasing soil organic matter; (4) remediating contaminated sites; and (5) integrating land use into all levels of government, including via the adoption of targets on soil and land as a resource (FAO, 2017).

In addition, the EU countries have issued several strategic documents to reduce land take, soil sealing and land degradation. Within the Common Agricultural Policy, 'greening' measures are intended to address land degradation issues, for example through the protection of permanent grasslands and ecologically valuable farmland as well as crop diversification. Overarching frameworks are also defined within the EU directives on the Environmental Impact Assessment and Strategic Environmental Assessment.

3.5   Food losses

Environmental (and economic) sustainability of agricultural and food systems can be adversely affected by the occurrence of food losses and waste in these systems, as they lead to wasted natural and economic resources. It is estimated that in Europe, 31 percent of the food produced for human consumption is not eaten by people and is largely spoilt and discarded. Eleven percent of this is discarded by consumers (FAO, 2011). Food losses and waste also undermines the adaptive capacities and resilience measures of vulnerable populations to cope with climate change, through decreased food availability and reduced income. In addition, food loses and waste is a major contributor to climate change. At the global level it accounts for about 8 percent of anthropogenic GHG emissions (FAO, 2015). Efforts to reduce food losses and waste in the ECA region are driven by SDG 12.3: "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including postharvest losses".

Figure 2 **Food losses across European and Central Asia sub-regions in 2013**
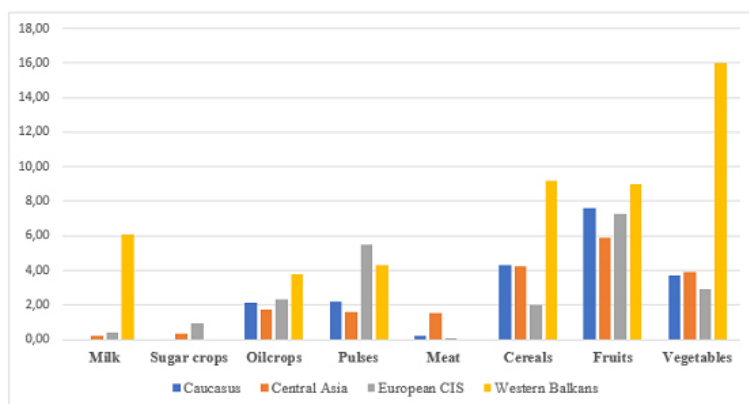
Source: FAO

The share of food losses for various categories of food differ across the ECA (European and Central Asian region, figure 2). More affluent countries of the Balkan region tend to have the highest share of food losses in vegetables, cereals and fruits. The Balkan countries are followed by the European CIS ones, where the highest levels of losses occur in fruits and pulses.

The underlying causes for food losses and waste differ across European and Central Asia countries and often depend on the level of economic development in the countries in question (FAO, 2014). The bulk of losses in middle and low income countries of the region are seen at the agricultural production and post-harvest handling and storage stages of food supply chains. These losses are largely due to inadequate harvest, post-harvest and storage equipment and technologies. Absence of investment in equipment and technology is compounded by the overall investment climate, the difficulty of doing business in many South-eastern European and former Soviet states and the discouragingly high rates of interest (often over 20 percent per annum) charged by commercial lenders to value chain actors.

Management, marketing and product development are also major underlying causes of losses, with country studies pointing to poorly qualified management and labour as being responsible for high levels of losses. In addition, the fragmented nature of agrifood production, caused by the breakup of public vertically-integrated production systems during the 1990s and the slow pace of consolidation into commercial farms have led to major challenges in value chain coordination owing to the large numbers of small producers.

The most recent estimates on European Union (EU) food waste levels indicate that 70 percent of EU food waste takes place at the household level, and in the food service and retail sectors, while 30 percent per cent takes place at the production and processing levels (FAO, 2017).

4   Conclusion

Ending hunger remains critically important but other forms of malnutrition have become widespread and must also be tackled. The challenge is to provide enough food for all without relying on a strategy of producing overabundant energy-dense and nutrient-poor foods in unsustainable food systems.

Food systems face big challenges to improving diets and nutrition around the world but also represent many opportunities: they contain large resource flows, they encompass many action points, and they embrace many potential agents of change. The key to identifying and seizing the opportunities will be a sense of urgency, an appreciation of the landscape in which action can and must occur, the connections between actions and outcomes and an ability to be bold in ambition and imaginative in partnership (HLPE, 2017).

A better knowledge of food systems, and of the interactions between food supply chains, food environments and consumer behaviour, is critical to understand why and how diets are changing and influencing people's nutritional status around the globe. Such understanding is needed to identify ways of intervening and applying a rights-based approach to improve FSN for all, especially the most vulnerable.

Current food systems have dramatic effects on human and planetary health and, if current trends continue, the current development process will not "self-correct" this problem neither in the short nor even in the medium term.

The effects of climate change are already being felt in many ECA countries and pose considerable challenges to agriculture production, as it will alter production conditions and increase the frequency of extreme weather events. As a result, in order to meet the interlinked challenges of food security and climate change, production systems must undergo significant transformations. As future production needs must occur largely on existing agricultural land, sustainable intensification practices must be adopted in the ECA region, not only to increase productivity and incomes, but also to safeguard the natural resources on which production depends (FAO, 2017).

Acknowledgment

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IMPORT OF AGRICULTURAL PRODUCTS IN THE CONTEXT OF THE EVOLVING LEVEL OF FOOD SECURITY

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Abstract

The main purpose of this paper was to assess the trading activity of agri-food importing countries with reference to changes in food security levels. The study covered agricultural commodities as a group of products involved in international trade. The timeframes for this study are the 1995-2015 period. The research was based on outcomes reported by ten key importers: the European Union, United States, China, Japan, Canada, Russia, Korea, Mexico, Hong Kong (China), Mexico and India. The basic source of data were online databases and reports, including those delivered by UNCTAD, FAO, WTO, WB and OECD. Once collected, the data was analyzed with the use of quantitative and qualitative research methods. Selected statistical methods (measures of dependence, position and variation), indices of structure and dynamics, indicators of the openness of economy, and indicators related to three dimensions of security (availability, access and stability) were used. The analysis resulted in numerous conclusions. In the study period, agri-food imports followed a global growth trend with alternating periods of contrasting developments, resulting in a decrease of the trade growth rate. The import trade openness of countries covered by this study was higher than that of global imports and followed a growth trend. The singularities of the development of agricultural sectors and markets were reflected in decreasing values of the exports-to-imports ratio both for agricultural commodities and foodstuffs, and were decisive for the positive growth rate of per capita agri-food production volumes. According to the analysis of correlation between changes to agricultural commodity imports and selected food security indicators, agricultural imports demonstrate a strong positive correlation with physical and economic availability, and a weak negative correlation with stability. Based on the above, a general conclusion may

be drawn that economic growth resulted in structural changes which contributed to improving access to food.

Keywords: *agricultural products, food security, importers, international trade*

JEL Classification: *F14, F41, Q17, F62*

1   Introduction

Agriculture is a national economy branch subject to specific environmental, climate, production and socio-cultural conditions. Therefore, agricultural products traded internationally are considered to be "sensitive" commodity. At the same time, all countries around the world are more or less dependent on the imports and exports of agricultural products which, for many of them, are of strategic importance from the economic and political perspective (as reflected by their commitment to self-sufficiency in basic products and their efforts to generate adequate incomes). This is a kind of "economic weapon" which guarantees the satisfaction of food security needs. That fact gave rise to discussions, considerations and questions regarding global agricultural trade. Having in mind the threats and needs of the globalizing economy, a question should be asked about the evolution of the involvement of specific countries in international trade in agricultural products. Did the key players reduce their trade flows? If so, is the evolution of trade correlated (and to what extent) to the development of food security? This is why the main purpose of this paper was to assess the trading activity of agri-food importing countries with reference to changes in food security levels. To interpret trading activity as a degree of country participation in agriculture products trading or measurable value of import and its fluctuations. To fulfil main target detailed analysis has been performed in a following scope: a comparative assessment of the importance of trade in agricultural products; the intensity of involvement of selected countries in the world agricultural trade; an evaluation of food security levels in three dimensions; and a test of correlation between imports and food security.

1.1   Agri-food trade and food security: a conceptual approach

A country's capacity to participate in global agricultural trade is primarily determined by the patterns and specifics of the agri-food sector. The strength of their impact on supply and demand depends on the type of goods traded and on their importance both for the importers and for the exporters. The country's natural and climate conditions are decisive for the spatial distribution, level and

commodity structure of the supply of agricultural products, and for the need to meet the demand through imports. Unequal access to such natural assets as arable land, forests and aquatic resources, as well as geographic location and diverse climate are the co-determinants of agricultural production (Jaworska, 2005). Also, the growing importance of non-natural conditions is noticeable. This partially results from the fact that the same natural environment conditions may be used in different ways depending on the scope and anthropological nature of activities, and on the socio-economic situation. Unlike the structural and technical factors, institutional and economic determinants are subject to frequent changes and are more subjective in nature. Among them, the economic policies (especially including the international economic policy of specific countries and country groups), and the international trade policy are of key importance (Jaworska, 2004).

Therefore, the real scope of farming activities creates barriers to the growth of supply of agricultural commodity which cannot be overcome in short term without additional costs. Also, incurring expenditure to increase food production volumes is only reasonable in countries with a strong agricultural potential; otherwise, it results in enormous opportunity costs (Herrmann, 2009). At the same time, the globalization process contributes to the growth of global production, whereas the development of world trade through the strengthening of links between agricultural and food markets of specific countries enables addressing the demand for the relevant products in a relatively stable and fast way. The above provides grounds for a relationship between trade in agricultural commodity and food security, basically in all of its aspects. As defined by FAO, food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 2017). This definition recognizes the multidimensional nature of food security by emphasizing the existence of its four basic pillars: availability, access, utilization and stability (UNCTAD, 2017b). Note that availability refers to physical supply of food from all possible sources, e.g. all forms of domestic production, commercial imports, food aid, etc. (Aurino, 2014).

However, the relevant literature provides various interpretations of physical availability. According to Zegar (2013), it means the agriculture's capacity to produce a sufficient quantum of food (agricultural commodity), at least equivalent to the minimum physiological demand. Herrmann (2009) believes that availability does not depend on whether the country is able to cover the domestic food consumption volume with domestic food production; instead, it depends on whether the country is able to generate enough financial resources to finance the required food imports. These different views are the consequence of the

evolution of the "food security" concept. According to some estimations, around 200 definitions and 450 relevant indicators exist (Mechlem, 2004). Pinstrup-Andersen (2009) believe that initially, it described the country's access to a sufficient quantity of food which enables meeting the demand for energy. Seen from this perspective, food security was believed by some authors to be equivalent to self-sufficiency. Note that food sovereignty was (and still is) used to measure the level of access to food, whether produced domestically or imported. Therefore, the "food security" concept focuses on the supply side, both in the national and global context. Panagariya (2002) makes a distinction between food self-sufficiency (which only requires the production of food in quantities corresponding to domestic demand) and food sovereignty which requires domestic availability. In this approach, self-sufficiency excludes imports as a source of supply whereas sovereignty takes this option into consideration. The supply process should be continuous and reliable which is a reason for maintaining stocks and establishing emergency food stocks to be released in the event of natural disasters. In turn, the economic availability of food is a "micro" aspect related to ensuring adequate quantities of food to households with various financial capabilities, whereas health and quality properties of food are related to safe consumption (Michalczyk 2012).

1.2 Trade openness vs. food security

While international trade is necessary to align the production and supply of agri-food products with domestic demand, it also enables balancing the local instability of production (UNCTAD, 2017b). Trade openness improves each dimension of food security. The flows from surplus to deficit areas improve the availability of food and increase the incomes of exporters (who charge higher prices in the market than it would be possible without trade) and importers (who make purchases at lower prices). Furthermore, production facilities are located in areas characterized by a relatively efficient use of resources. This contributes to higher incomes and faster economic growth, as confirmed by a research conducted by the World Bank in countries who liberalized their trade policies (Wacziarg & Welch, 2008).

Also, open trade may improve the balanced nutrition patterns through product diversification while helping make availability more stable, because the total production risk across international markets is lower than domestic production uncertainty (Brooks & Matthews, 2015). Authors of "Food Security, Farming, and Climate Change to 2050" (Nelson, Rosegrant et al., 2010) conclude that the negative effects of climate change on food security can be counteracted by economic growth, improved agricultural productivity and robust international trade in agricultural products. The observations conducted by FAO (2005) also confirm the

existence of a generally positive relationship between market openness and food security. Tallard, Liapis and Pilgrim (2016) clearly state that it is not the lack of available food that is the fundamental problem, but rather effective access to that food; and that trade plays an increasing role in ensuring food availability. Therefore, it could be assumed that importers (mainly net importers) of agricultural commodity increase their involvement in international trade in an effort to progressively improve the levels of domestic food security. Due to lack of comparative advantages in food production, food shortages are offset mainly by increased import volumes. The consequence is the reallocation of resources in line with the competitive advantage. However, there is a risk that import changes are related to a collapse of domestic production, economic development problems or a market distorting policy.

It is also important not to underestimate the events that took place in the last one or two decades, primarily including the 2007-2008 food crisis, which made the governments worry about trade openness and its consequences, and forced them to change their approach due to food security reasons. Importing countries realized that although dumped imports were a problem, the absolute shortage of supply in international markets could be even worse and more likely, considering the developments taking place in the global economy. These included a strong surge in demand for agricultural commodity produced by the biofuel sector, the increasingly frequent extreme weather conditions caused by climate change, and the rise in prices (Chatterjee & Murphy, 2014). Factors which particularly affected food security and agriculture (including agricultural trade) also include: higher prices of energy, the main determinant of production costs; decline in agricultural productivity (green revolution technologies fail to ensure a considerable increase in productivity anymore while genetic engineering is still in its infancy and faces a series of political, technical and regulatory complications); the improper regulation of futures markets; and the increased number of speculative transactions. Therefore, although primarily a national challenge, food security requires a robust, properly regulated international trade system which strengthens the internal economic policy (Chatterjee & Murphy, 2014)

2   Data and Methods

The study covered agricultural commodity as a group of products traded internationally, divided into food and agricultural raw materials in accordance with SITC. The timeframes for this study are the 1995-2015 period. The research was based on the outcomes of ten key importers selected by average value of imported agricultural products. This group included the European Union, United States,

China, Japan, Canada, Russia, Korea, Mexico, Hong Kong (China), Mexico and India. The basic source of data were online databases and reports, including those delivered by UNCTAD, FAO, WTO, OECD and WB. Once collected, the data was analyzed with the use of both quantitative and qualitative research methods. To describe the structure of phenomena under consideration, selected statistical methods were used, including: measures of dependence (Pearson correlation coefficient), measures of position, measures of volatility and structural and dynamic indicators. The comparative assessment of the importance of trade in agricultural products, and of the intensity of involvement of selected countries in the world agricultural trade was enabled by purposefully selected measures, such as: trade openness rate, import rate, import penetration index, import intensity index, share in total imports, and Trade Coverage internal comparative advantage measurement index.

Food security results may be analyzed at multiple levels, from the global and national level of food availability, through the assessment of the households' access to food, to individual nutrition performance. For various reasons, it is difficult to reach a consensus on a common framework for food security monitoring on a national and global basis. This ultimately boils down to selecting the most adequate database for the assessment of the global level of food security (Aurino, 2014). Therefore, in this paper, the progress in improving the importers' food security was assessed based on five indicators: value of agri-food production per capita; GDP per capita; share of agri-food imports in total exports. The selection of indices was determined by the multidimensionality of food security and the macroeconomic nature of this analysis. The indices refer to three dimensions of security: availability, access and stability.

3   Results and Discussion

The globalization process results in profound changes to the global economy. Increased use of resources, technological improvements and progressing specialization have led to strengthening the economic links between countries and to enhancing the scope of international trade flows (Jaworska, 2012). Trade globalization has progressed despite crises, natural disasters or geopolitical tensions which are also responsible for price instability and changes in the group of leading trading partners (WTO, 2015). From 1995 to 2015, in real terms, the total volume of global trade flows tripled while that of global production nearly doubled. The growth rate varied over the years (data: WTO, 2017). Major events that affected the levels of international trade include: the 1995-2001 Mexican peso crisis, the 1997 Asian financial crisis and the bursting of the dot-com bubble in 2001. Other

notable events with particularly significant impacts were the accession of China to WTO in December 2001, the adoption of euro at the beginning of 2000, the increase in oil prices resulting from a strong demand for natural resources in China, and the political instability in oil-producing countries (the so-called Arab Spring). The last decade was determined by the consequences of the 2008 financial crisis caused by the collapse of the US subprime mortgage market, leading to a global recession in 2008-2011. Since 2011, the European debt crisis has considerably affected the growth of global trade. Combined with the growing geopolitical tensions, it resulted in a commercial slowdown in 2014 (WTO, 2015). The 2015 trade statistics were conflicting not only with previous trends but also with the general condition of the market environment, indicating the weakening of economic interdependence (UNCTAD, 2017a).

The presented external shocks have left their imprint in the general trends of world trade flows in the agricultural sector (Aksoy & Ng, 2010; Josling, Anderson, Schmitz & Tangermann, 2010; Trostle, 2008). During the 21-year study period, the volume of agri-food trade flow grew by more than 2.5 times. The following contrasting fluctuations around the global growth trend were recorded: boom years (2003-2004, 2007-2008, 2010-2011), relative stagnation (1995-1996, 2001-2002, 2005-2006, 2013-14) and regression (1997-2000, 2009, 2012, 2015). In these sub-periods, compared to global commodity trade trends, changes in agricultural trade volumes were less dynamic and relatively highly convergent (Jaworska 2012). The growth in global trade volumes was accompanied by relatively small structural changes (Aksoy, 2005) which affected imports more than exports and agricultural raw materials more than food. As regards exports, the index of structural changes remained below 0.196 from 1995 to 2015, and the concentration index was barely 0.137. The respective figures for imports were 0.173 and 0.270. In the total world trade, these levels were higher for exports (by 0.02) and lower for imports (by 0.01 and 0.09) (UNCTADstat, 2018).

In 1995, the nominal value of agricultural imports reached USD 617,793 million, representing 11.91% of total imports. In 2015, that amount was USD 1,606,640 million, i.e. 9.74% of global imports (Fig:1). Foodstuffs prevailed (80%) in the commodity structure. In the study period, over 40% of global demand originated from the European Union, including 2/3 addressed as a part of internal trade. Ranked next in the group of main agricultural importers were: the United States with an average share of 9.34%, Japan (6.76%), China (6.54%), Russia (2.28%), Canada (2.30%), Korea (1.98%), Mexico (1.72%), Hong Kong (China) (1.58%) and India (1.20%). The agricultural commodity trade flows to/from the countries considered are of crucial importance for the global market (a share in excess of 76.14%). However, in most of these countries, products of agricultural

origin are not a decisive component in their international trade volume. In the period considered, the highest average share was reported by Japan (14.5%) and Russia (18.37%). From 1995 to 2015, 9 out of 10 of the economies covered by this study recorded a decline in the share of agricultural imports. The largest drops were reported by Japan, Russia, EU28 extra and Korea. Meanwhile, Canada saw a growth of that share.

Figure 1 **Structure of global agricultural imports in 1995-2015**
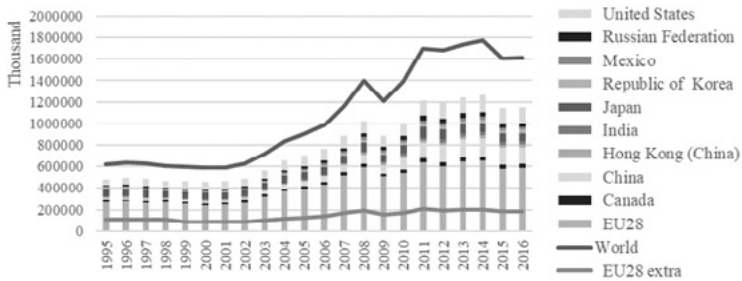
Source: Own study based on UNCTADstat. (2018). *International trade in goods and services, 1995-2015.*

The induction does not sufficiently support the generally recognized pattern of decreasing importance of agricultural trade in commodity trade flows. Although the average yearly pace of changes in import shares was negative in all countries except Canada, opposite trends could be observed in some periods. There was a backsliding in 2001-2003, 2007-2009 and 2013-2015. The highest decline was reported in 2009 by all 10 importers (Fig: 1). As regards nominal values, the agricultural imports followed a general trend. Despite the impasse in 1997-2000 and 2009, 2012 and 2015, the average annual growth rate of imports reported by the countries considered was 4.44%. The highest rate was recorded in China (12.15%) where the value of purchased agricultural commodity increased nearly tenfold from 1995 to 2015. Ranked next were India, Mexico and Canada. In 2015, only the Japanese spent 5% less on food and agricultural raw materials than in 1995.

In the group of countries considered, Canada, India and the US were not net importers of agricultural commodity over the 1995-2015 period. As regards the other seven economies, the average ratio of agricultural imports to agricultural exports ranged from 1.06 to 3.09. The peak value (the reciprocal of the Trade Coverage internal comparative advantage measurement index; Misala, 2003) was recorded in Japan which also demonstrated a clear downward trend. The analysis

of variation of TC levels provided some ambiguous information. While it allows to conclude that the instability of the imports-to-exports ratio tends to grow over time (from 2008), it does not suggest any coincidence between the evolution of that ratio and the world's macroeconomic situation.

A country's vulnerability to economic shocks largely depends on its trade openness. The higher the imports in relation to gross domestic product, the greater is the economic impact of the condition of international markets. In import-dependent countries, especially in those relying on imports of raw materials with strategic importance to economic development, high economic openness poses a threat in the case of a sharp upward movement in prices in global markets (Białowąs, 2013). As regards global imports, trade openness measured by taking account of the profitability of global economy was very low, reaching an average level of 2% of GDP and 1.93% of GNI. A downward trend was recorded until 2000, followed by an upward trend (except for 2009 and 2015). In turn, the imports in countries covered by this study had a greater contribution to their incomes (an average level of 2.50% of GDP and 2.39% of GNI); that share decreased steadily throughout the period from 1995 to 2006. Steady growth has been recorded from 2007, and therefore the shares observed in 2015 were higher than in 1995, except for Russia and China (Tab: 1). It was the opposite for the openness of the agricultural sector. The contribution of agricultural commodity imports to the agricultural GDP was above 55%, with the highest levels being observed in 2006-2008. In the group of importing countries, it was even higher and more differentiated, and followed an upward trend. The leaders of this ranking were Hong Kong, EU, Canada and Japan. However, caution should be exercised when making conclusions about economic openness based on the above indicator because it is largely determined by the size of the economy itself (Radło & Kowalewski, 2008).

The penetration index, which informs of the proportion of domestic demand satisfied with imported products, is particularly important when assessing a country's involvement in international trade. The global agricultural imports covered 2.01% of demand and grew over the study period, especially in the years prior to the regression. However, contrary to the global trend, the contribution of imports declined in the group of countries considered; also, it was more diversified and lower by 7.92% on average. Hong Kong and Russia saw a relatively high degree of dependence of their domestic demand on imports (primarily as regards agricultural raw materials).

The assessment of the activity of importing countries is supplemented by the analysis of the import intensity index. Globally, over the 1995-2014 period, the share of agricultural commodity in the final domestic production of

the agricultural sector ranged from 50% to 60%, with the highest levels being recorded in 2001-2008. The average absorption of imported agricultural commodity by the production of the economies under consideration was much higher, and followed an upward trend. In 1995, the import intensity index was close to 60%; 21 years later, it was higher by 32 percentage points. However, these levels were not characteristic for all countries. The scope of the globalization process of trade in agricultural commodity was disproportionately low in Canada and China (Tab: 1).

The analysis of per capita imports sheds some objective light on the assessment of importance and intensity of trade in agricultural commodities at the level of key global importers. That index is extremely sensitive to the number of population and to the lack of diversity in trade flows to/from the country concerned (Jeliński, 2003). Over the 1995-2015 period, its values reflected the general trends because of a relatively small population growth in most of the countries. The average value of agricultural imports per capita was USD 156, i.e. nearly 4 times more than in the group of countries covered by this study. In 2015, the highest amount was recorded in Hong Kong, EU and Canada. These economies were also top-ranked in terms of imports per agricultural employee. Note that China and India recorded the lowest values of the above index while enjoying a twice higher average annual growth rate.

Table 1 **Average annual growth rate of selected indices in the group of main agricultural importers in 1995-2015 (%)**

Wskaźnik	World	EU 28	Canada	China	Hong Kong (China)	India	Japan	Republic of Korea	Mexico	Russian Federation	United States	10 Importers
Indicators of the involvement of importers in the world of agricultural trade												
(1)	4,89	3,79	5,87	12,15	3,50	11,42	-0,05	4,12	7,70	3,55	5,56	4,44
(2)	-1,00	-0,85	1,03	-1,24	-1,78	-1,03	-3,11	-1,81	-1,06	-1,85	-0,09	-1,24
(3)	0,42	1,07	0,99	-2,10	-0,36	1,94	1,05	-0,49	1,06	-2,48	1,14	0,32
(4)	0,38	1,06	0,87	-2,18	-0,39	1,94	0,90	-0,54	1,00	-2,42	0,97	0,26
(5)	0,42	1,09	0,90	-2,13	-0,41	1,92	1,04	-0,48	1,05	-2,38	1,12	0,32
(6)	0,42	2,49	1,62	4,62	0,72	5,05	3,22	3,89	3,11	1,94	1,56	0,25
(7)	3,59	3,54	4,80	11,49	2,65	9,70	-0,11	3,55	6,14	3,70	4,58	3,56
Food Security Indicators												
(8)	3,95	1,88	3,70	7,59	2,43	5,02	-2,73	0,18	3,79	4,10	3,26	4,06
(9)	4,00	1,89	3,87	7,64	2,43	5,07	-2,67	0,24	3,82	4,10	3,55	4,08
(10)	-1,05	-0,86	1,92	-2,14	-1,92	0,20	-1,75	-3,10	-0,41	-3,84	0,68	-1,23
(11)	-0,52	-0,37	2,71	-1,58	-1,02	2,05	-0,96	-0,87	0,36	-4,01	1,77	-0,72
(12)	3,16	2,44	3,77	13,87	3,02	7,61	-1,14	4,06	5,03	6,34	3,41	3,22

(1) agricultural imports, (2) share of agricultural imports, (3) economy openness degree, (4) imports ratio, (5) import penetration, (6) import intensity, (7) agricultural imports per capita, (8) agricultural production per capita (9) food production per capita, (10) share of agricultural imports in total exports, (11) share of food imports in total exports, (12) GDP per capita

Source: calculations and the author's study based on: UNCTADstat (2018). International trade in goods and services, Economic trends. 1995-2015 and FAOSTAT (2018). Food and agriculture data: Production. Population, Macro-Statistics, Food Security. 1995-2015.

When considering the availability and stabilization dimensions of food security at national and global level, particular attention should be paid to the ability to provide enough resources to finance the required food imports, and to the domestic production per capita. The singularities of the development of agricultural sectors and markets were reflected in the values of the exports-to-imports ratio both for agricultural commodities and foodstuffs. Because of the relatively small importance of these products for the total trading volume, the average value of that ratio did not exceed 10% and demonstrated slight fluctuations (±0,82). In the group of leading agricultural importers, the average value of the above ratio was barely 0.05 percentage points higher and was less variable. The highest exports-to-agricultural-imports ratios were recorded in Japan and Russia, while a general downward trend was evident (Tab: 1). Interestingly, the index doubled between 1995 and 2015 in countries other than net importers, i.e. Canada, India and the US. Similar changes were observed for the exports-to-food-imports ratio. Note that with its growing economic potential and relatively favourable production conditions, China was ranked last among the importing countries, reporting a ratio of 3.84%.

A more complete picture may be presented by assessing the agricultural production value per capita. However, the level and structure of that index is still determined by natural and climate conditions. Over the 1995-2014 period, it evolved consistently with the general trends. Only twice, in 2005 and 2014, a decline was reported. Globally, in 2014, the index reached nearly USD 425 with an annual growth rate of 3.9%. Because of negligible agricultural production per capita in Hong Kong, the value of the index for the 10 countries covered by this analysis was higher by just one half (Tab: 1). As foodstuffs represent a fundamental part of agricultural production, the changes to and the level of food production per capita were only several percent lower. Undeniably, import activities of selected economies depend on their production potential. The higher the intensity of agricultural production and the higher the concentration of agricultural production on a relatively large privately held agricultural area, the weaker is the willingness to develop agricultural imports irrespective of global changes. Most of these characteristics can only be found in agricultural sectors of highly developed countries, primarily including the US, EU or Canada. This is exactly where one of the highest levels of agricultural production per capita were recorded. In other countries, production remains at a relatively low level and strongly depends on the area of agricultural land.

The analysis of correlation of changes to agricultural imports value and selected indices that enable monitoring the food security levels over the 1995-2015 period allowed to specify the correlation between agricultural imports and the

development of food security. As shown by the results, at the global level, a strong positive correlation exists between agricultural imports and the physical and economic availability, and a weak negative correlation exists between agricultural imports and stability (Fig: 2). The coefficient of correlation for agricultural production per capita, food production per capita and GDP per capita was 0.991, 0.992 and as much as 0.993, respectively. Similar levels (0.988, 0.988 and 0.991) were recorded in the group of economies covered by this study. Based on the above, a general conclusion may be drawn that economic growth resulted in structural changes which contributed to improving access to food. Values of the coefficient of correlation between imports and GDP per capita, as calculated for specific economies, showed only minor variations and ranged from 0.983 to 0.949, except for Japan where a clearly lower value (0.832) was reported. Together with Korea, Japan demonstrated a moderate positive correlation as regards physical availability of food. In other countries, these values ranged from 0.923 to 0.992.

Figure 2 **Correlation between changes in the value of agricultural imports and food security levels over the 1995-2015 period**

(1) agricultural production per capita, (2) food production per capita, (3) share of agricultural imports in total exports, (4) share of food imports in total exports, (5) GDP per capita

Source: Calculations and the author's study based on: UNCTADstat (2018). International trade in goods and services, Economic trends. 1995-2015 and FAOSTAT (2018). Food and agriculture data: Production. Population, Macro-Statistics, Food Security. 1995-2015.

Important information is provided by the analysis of relationships for food security stability indices. Though the relationship is clear, it is relatively weak both at global level and in the entire group of importing countries considered. The increase in agricultural imports was accompanied by a decline in food security levels measured with the total-exports-to-agricultural-imports ratio (-0.495; -0.567) and the total-exports-to-food-imports ratio (-0.307; -0.400) (Fig: 2). The

correlation between these characteristics varied extremely strongly from one country to another. A significant negative correlation for agricultural commodity was recorded in India, Korea and Russia whereas a positive correlation was discovered for foodstuffs in Mexico and US. In the case of food, a low negative correlation was demonstrated by Japan, India and Korea. While practically no correlation was found in China and Hong Kong, remarkably strongest correlation levels were reported in Canada.

4   Conclusion

The theoretical and empirical analysis performed in this paper answered the research question asked in the introduction and enabled the implementation of the main research plan which was to assess the trade activity of agri-food importing countries in relation to the changing level of food security. The discussion resulted in the following conclusions and generalizations.

Over the 1995-2015 period, agri-food imports grew by more than 2.5 times while their share in total imports consistently followed a downward trend (except for 2009). The following contrasting fluctuations around the global growth trend were recorded alternately: boom years, relative stagnation and regression. Especially as regards the last type of events, there was an inhibiting effect on trade flows. In the group of countries considered, Canada, India and the US were not net importers of agricultural commodity. While the variation of the imports-to-exports ratio allows to conclude that the instability of the imports-exports relationship tends to grow over time (from 2008), it does not suggest any coincidence between these changes and the world's macroeconomic situation.

As regards global imports, trade openness measured by taking account of the profitability in the global economy was very low. In the countries covered by this study, imports had a greater share in incomes and followed a downward trend. Conversely, the contribution of agricultural commodity imports to the agricultural GDP was much higher and followed an upward trend. The singularities of the development of agricultural sectors and markets were also reflected in the decreasing values of the exports-to-imports ratio both for agricultural commodities and foodstuffs. That ratio doubled in countries other than net importers. The level of agri-food production per capita was driven by natural and economic determinants. In the study period, the ratios listed above demonstrated a positive growth rate.

According to the analysis of correlation between changes to agricultural commodity imports and selected indicators for the monitoring of food security levels, agricultural imports demonstrate a strong positive correlation with physical and

economic availability, and a weak negative correlation with stability. This was true both on a global basis and for the agricultural importers covered by this study. Based on the above, a general conclusion may be drawn that economic growth resulted in structural changes which contributed to improving access to food.

The final conclusion is that the above assessments and results allowed to specify the trends and identify the basic relationships while revealing a process of cumulative changes. On the other hand, this is the starting point for further research because this paper provides information at a relatively high level. Also, the results do not provide a complete unambiguous recommendation as to the evaluation of relationships between economic openness and food security levels. The evidence shown in this paper is relatively soft. Therefore, a need emerges for a more in-depth study which takes into consideration the analysis of price instability impacts and more indices, including those related to trade policy activities.

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SELF-SUFFICIENCY OF SELECTED COMMODITIES IN VISEGRAD COUNTRIES

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Abstract

This paper deals with the development of self-sufficiency in selected commodities in the Visegrad countries (Czech Republic, Hungary, Poland, Slovakia) between 2006 and 2016. The data are drawn from the statistical offices of the individual countries in the form of production/consumption balances. This contribution aims to measure self-sufficiency of Visegrad countries in selected (most important) commodities (wheat, eggs, potatoes, beef, poultry and pork), characterise its direction of development and influencing factors. The results show that the Czech Republic is self-sufficient in production of wheat and beef. On the other hand, Czech Republic is unable to cover domestic consumption in potatoes, eggs, pork and poultry. In poultry or pork meat, the situation is very alarming, the degree of self-sufficiency is only 55% and 63% respectively. The situation in Slovakia is very similar to the Czech Republic. In eggs, wheat and beef; the degree of self-sufficiency is above 100%. However, in potatoes, pork and poultry meat, Slovakia does not cover consumption by domestic production. Poland, except for a few years in the case of wheat and pork, is fully self-sufficient in all other commodities evaluated. Also in Hungary, the degree of self-sufficiency is close 100% or above.

Keywords: *Commodities, Czech Republic, Hungary, Poland, Self-sufficiency, Slovakia, Visegrad*

JEL Classification: *Q18, R14*

1   Introduction

Food self-sufficiency belongs to internal factors of national security and therefore it deserves sufficient attention. Multiple authors (Kapusta & Parvi, 2016; Haji-Rahimi, 2014; Prochazkova, Prasilova & Hlouskova, 2016; Grodea, 2017; Golebiewska & Stefanczyk, 2017; Demirbaş, Niyaz & Daysal, 2017; Kotyza & Slaboch, 2017; Sadowski & Baer-Nawrocka, 2016) paid their attention to the problem of self-sufficiency of various countries and commodities. Rate of self-sufficiency measures the ability of a given country to satisfy all needs of consumers from the country's domestic production. (Staatz, 1991; Minot & Pelijor, 2010) The term self-sufficiency is often confused with the term food security. Whole concept of self-sufficiency, on contrary to food security, take in consideration whether food is imported or produced locally. (Clapp, 2014)

Today self-sufficiency became an important aspect of national policy agenda, mainly after the price volatility shocks of 2007 and 2008. Many countries since than expressed their interests in improving supply of domestic food production. The debate over food self-sufficiency has usually two dimensions. One defend national right to insulated national market from world food markets by increasing domestic food production. The others argue that such measure increase costs to states that prioritize political considerations in their food policy. (Clapp, 2017)

Food self-sufficiency was a serious problem during the Second World War as food convoys were important to prevent hunger and lack of food. Gaining food self-sufficiency today would involve securing home production of fertilizers and other agrichemicals, as well as ensuring home processing and storage. The costs are extraordinary and would eliminate military budget. (Helm, 2017)

But the self-sufficiency is not only connected to national or regional production, but the problem of self-sufficiency is discussed also on the level of households. Countries, regions or even households are better protected from global, regional or local shocks if they have some level degree of self-sufficiency (Fraser et al. 2005; Pradhan et al. 2014).

In general, there are different concepts of food self-sufficiency. They range from an extreme form where a government closes its borders completely, to the situation when country aims to increase its domestic production capacity (Clapp, 2015). In other words, better self-sufficiency could be reached via international or improvements in production. Therefore, within an open market of the EU, ration of self-sufficiency indicate, to a certain extent, whether country has an advantage over other countries.

Based on above stated information, this contribution aims to measure self-sufficiency of Visegrad countries (Czech Republic, Hungary, Poland, Slovakia) in selected (most important) commodities and characterise its direction of development.

2 Data and Methods

According to Staatz (1991) there exists several possibilities how to explain national self-sufficiency. First, calculations could be based on complete specification of commodity (cultivar, class, place of cultivation, manner of cultivation), this is regarded as the most accurate method. Second, calculation is done only for a specified commodity with respect to species, (rice). Third, the self-sufficiency could be calculated for a wide category of goods (cereals) containing several commodities mutually complementing one another. In addition to Staatz (1991), fourth approach could be applied. (Sadowski, Baer-Nawrocka, 2016) It uses energetic balance, i.e. domestic production and consumption expressed in calories.

In this article the second Staatz's (1991) approach was applied. Self-sufficiency was calculated using data about production and consumption of a specified commodities (potatoes, eggs, wheat, beef, pork and poultry meat) in the Czech Republic, Hungary, Slovakia and Poland. Due to the extent of the conference contribution, only self-sufficiency calculations are taken in consideration, no other indicators were calculated.

Aim of this article is to analyse rate of self-sufficiency development in potatoes, eggs, wheat, beef, pork and poultry meat in the Czech Republic, Hungary, Poland and Slovakia. These countries created informal community that is called Visegrad due to its historical, political and geographical proximity. The rate of self-sufficiency is analysed between years 2006 and 2016, based on the data from national statistical offices (CZ – CSU – Czech statistical office; HU – KSH – Hungarian central statistical office; PL – GUS – Statistics Poland; SK - SU SK – Statistical office of the Slovak Republic). Information about production and consumption were gained from national commodity balance sheets. If for a certain commodity and country full data set of all analysed years was not available, only available data were used.

The calculation of the rate of self-sufficiency is carried out according to the following formula (Lohoar, 1981):

Rate of self-sufficiency=(domestic production/consumption)x100 (%) (1)

3   Results and Discussion

This section presents the results of self-sufficiency for individual selected commodities in Visegrad countries.

Potatoes

The degree of self-sufficiency of potatoes is presented in the graph 1. The results show that the Czech Republic and Slovakia are not able to cover domestic consumption from domestic production. In the case of the Czech Republic, the degree of self-sufficiency ranges from 66 to 83%. The fluctuations were caused by change in production, while consumption remained relatively stable (ranging from 950-1100 ths. tons). The production was mainly influenced by fluctuations in yields as well as reduction of harvested area. Total harvested area decreased by 13 ths. hectares (-13%) between 2006 and 2016. As it was already mentioned, the use of potatoes is relatively stable, only utilization is changing. During the analyzed period, consumption is decreasing for human consumption (consumption per capita decreases from 72 kg to 66 kg), but consumption of potatoes for starch production is on the increase (+ 40 ths. tons). Similar development can be observed also in Slovakia. Here it is worth highlighting the significant fall in self-sufficiency in 2010, which was caused by a drop in total production (-45 %) over the previous year due to significant drop in hectare yield (only 12 tons per ha in 2010 caused by unfavorite climatic conditions). At the same time, also total harvested area is on decline, between 2006 and 2016, harvested area was limited by 50% (-10,000 ha). All above mentioned factors caused that the degree of self-sufficiency in 2016 reached only 68%. In Poland, the degree of self-sufficiency is above 100%, the only exception was 2008, when the value falls to 99%. While self-sufficiency is constant, total consumption and production changed. Total consumption falls by 5.477 million tons (-48%, of which -2 million tons for human consumption) and total harvested area falls by 37% (-200 ths. ha). In Hungary the degree of self-sufficiency has a growing trend, it increased from 93% in 2010 to above 102% in 2016. Similarly, to other Visegrad countries, also in Hungary total production and consumption has falling trend. Between 2010 and 2016 total production decreased by 24% (- 120 thousand tons) due to drop in harvested area which is large as in other countries. Over the monitored period, harvested area falls by 3 thousand hectares (-15%). Overall, the trend shows a downward trend in potato consumption. Between 2006 and 2016, consumption was affected by elimination of potatoes in human diet caused by changing consumer preferences. Kotyza & Slaboch (2017) observed average decline of human consumption close to 2kg per capita and year in Slovakia and Poland. Stock feed potatoes were eliminated after

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1990 as substituted by other fodder crops (e.g. fodder maize, rapeseed, cereals). (Kotyza, Slaboch, 2014)

Figure 1 **Degree of self-sufficiency, potatoes (2006-2016, %)**
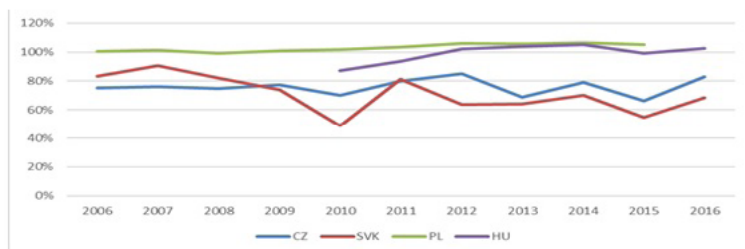
Source: Own processing based on data from CSU, KSH, GUS and SU SK.

Eggs

In the case of self-sufficiency in eggs, the situation in the Czech Republic, Slovakia and Hungary is relatively balanced. In the Czech Republic, self-sufficiency ranges from 78 to 93%. Figure 2 shows a slightly decreasing tendency of the degree of self-sufficiency, mainly due to slightly increasing consumption (+10% increase over the monitored period) and a constant level of production, which ranges from 2,100 to 2,250 million pcs. A similar situation is also found in Slovakia, where the degree of self-sufficiency ranges from 90-105% and is relatively stable since 2008, with no significant fluctuations. Consumption, as in the case of the Czech Republic, shows a gradual increase until 2014, up to the level of 1,190 million pieces. Production is stable without extreme fluctuations. Hungarian degree of self-sufficiency in eggs is slightly below 100%. Opposite to the Czech Republic and Slovakia, Hungarian consumption has negative trend. Between 2006 and 2015 the consumption fell by 13% (from 3,139 to 2,743 million pcs) which means decrease in annual per capita consumption from 273 to 223 pieces. In Poland, the egg production balance is express tones. In Poland, there is a significant increase in the degree of self-sufficiency from 112 in 2006 to 169% in 2015. This change could be explained by a significant drop in domestic consumption as it went down from 487 ths. tonnes to 349 ths. tonnes. The production is relatively stable and ranges from 550 to 630 ths. tonnes. Excess in production forced producers to export eggs mainly to the EU market. As it is obvious Polish producers succeeds as their trade balance (both in value and volume) constantly increases. (Kapusta, Parvi, 2016)

Figure 1 **Degree of self-sufficiency, eggs (2006-2016, %)**
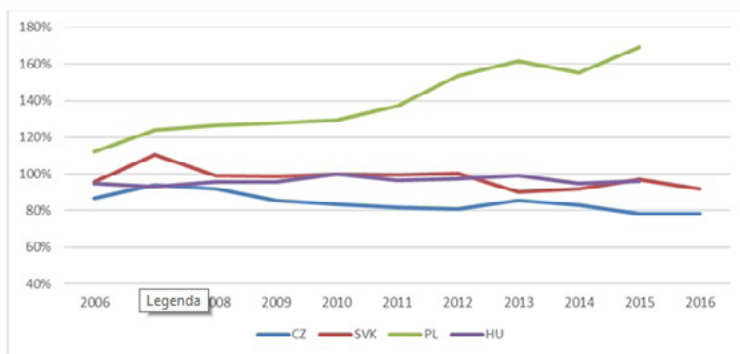
Source: Own processing based on data from CSU, KSH, GUS and SU SK.

Wheat

Out of cereals, wheat was selected due to its dominance in total harvested area. The degree of self-sufficiency in the Czech Republic ranges between 115 and 193%; figure 3 shows a growing tendency. The growth of self-sufficiency was pushed by increased production that rose from 3.5 million tons (2006??) up to 5.47 million tonnes (year 2016). In 2012 production felt significantly due to unfavourable climatic conditions, while consumption remains stable. Total consumption ranges from 2.84 to 3.04 million tonnes. Approximately half of the consumed wheat is used for the food industry, while the second half is consumed as feed for livestock (about 1.25 million tons) or for technical use (about 150 ths. tons). In Slovakia, the development of self-sufficiency is very similar to that of the Czech Republic. Degree of self-sufficiency grew from 127% in 2006 to 183% in 2016. Only in 2010 and 2012 extremally low values are observed caused by decline in yields due to unfavourable climatic conditions. Increasing self-sufficiency was pushed by increase in total production that increased from 1.34 million tons (2006) to 2.43 million tonnes (2016). Total wheat consumption remains stable and it is divided into food-processing industry (approximately 35% of production), animal feed (approx. 41%) and technical use (increased from 107 ths. 226 ths. tonnes). Hungary's degree of self-sufficiency in wheat production ranges between 136 and 211% for the 2010-2016 period. It evinces growing tendency, caused similarly to CZ and SK by increased total output. The total production grew from 3.74 up to 5.6 million tonnes. Consumption does not evince significant deflection as it ranges between 2.66 and 2.73 million tonnes. As it is evident, in 2015 about half of the production needed to be exported, while other half was used domestically for food industry and as a feed crop (1,21 and 1,16 million tonnes respectively). Polish degree of self-sufficiency constantly increases (77 -> 150%) without

any annual shocks. Only in 2006 (76.9%) and 2007 (97%) Polish production was not able to cover domestic consumption. After 2012, fast growth in self-sufficiency in wheat is observed. This change was pushed by production increase from 7 to almost 11 million tonnes. On contrary to production, consumption felt from 9.1 (2006) to 7.8 (2016; -15%) million tonnes; mainly because wheat substitution by other fodder crops. As it is obvious, all Visegrad countries produce more wheat than they can consume. Thus raw commodity needs to be exported and in many cases later on the wheat is imported in the form of processed product. Therefore, policy makers should ask, what is more beneficial, to sustain self-sufficiency in production or to invest (politically, financially) in more value-added processing.

Figure 2 **Degree of self-sufficiency, wheat (2006-2016, %)**
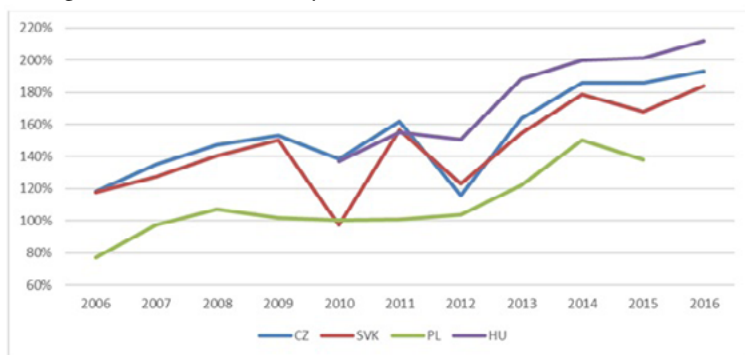
Source: Own processing based on data from CSU, KSH, GUS and SU SK.

Beef

For self-sufficiency in meat, three types of meat were selected - beef, pork and poultry; three kinds of meat consumed the most. For beef, it can be concluded, that all analysed countries are self-sufficient (Figure 4), with only some exceptions for Hungary. On contrary Polish degree of self-sufficiency is so high, that its values are indicated on the right vertical axis. In the Czech Republic, the degree of self-sufficiency ranges from 104-146%. But beef has very low share on total meat consumption (10%; approximately 7 kg per capita and year). The production was very stable between 2006 and 2016, it fluctuated between 166 and180 ths. tonnes. The data used presented a decreasing trend in consumption, which reflected by the growth of the degree of self-sufficiency. Between 2006 and 2016, total consumption felt by 37 ths. tonnes. From 2014, the Czech degree of self-sufficiency was almost constant, 140%. In Slovakia, the degree of self-sufficiency ranges from 105 to 133%. Average per capita consumption of beer was only 4.1 kg. Total production ranges from 20 to 28

ths. tonnes, while consumption fluctuated from 18 to 25 ths. tonnes. In Hungary, we observed the degree of self-sufficiency from 96% (2014) to 115% (2008). The average annual per capita consumption per year is only 3kg, in 2013 it was only 2.2 kgs.

Total production ranges from 24 to 33 ths. tonnes, while consumption fluctuated from 24 to 34 ths. tonnes. Because in some years consumption and production almost met, in 2006, 2010, 2014 and 2015 was the degree of self- sufficiency below but close to 100%. In Poland, the degree of self-sufficiency lays far above 100%. Between 2006 and 2009 it reached values above 200%, while after 2010 it increased from 400% to over 550%. Comparing to other countries, average annual per capita consumption was only 1.2 kg in 2015, while in 2005 it was 3.9 kg. The rapid growth self-sufficiency was largely caused by increase in domestic production. It increased from 388 up to 543 ths. tonnes. The second most important factor is the fall in domestic consumption (-96 ths. tonnes). Both factors contribute to a very high degree of self-sufficiency exceeding 500%. In general, it can be concluded, that high self-sufficiency in beef is mostly caused by low share of beef in human diet in the selected countries.

Figure 4 **Degree of self-sufficiency, beef (2006-2016, %)**
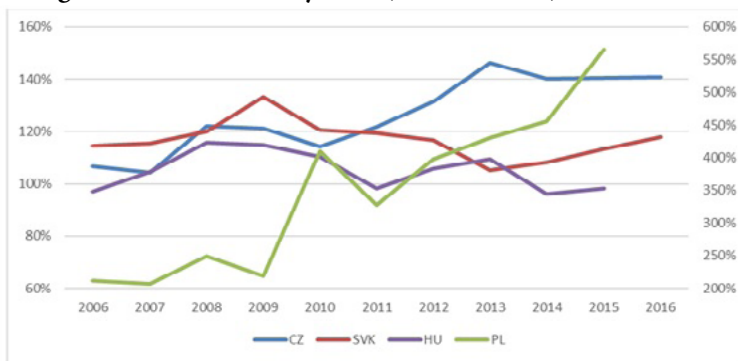
Source: Own processing based on data from CSU, KSH, GUS and SU SK.

Pork

The degree of self-sufficiency in pork is very low the Czech Republic, and the downward trend is still evident over the monitored period (see Figure 5). Pork meat has the largest share in total meat consumption, per capita consumption fluctuates about 40 kg, which represents 57% of the total meat consumption. From this point of view, pork is the most important meat type. The fall in self-sufficiency is caused by significant drop in production, while in 2006 total production was 450 ths. tonnes, in 2016 it was only 310 ths. tonnes. Decline in production was mainly caused by the low profitability of pig breeding. The results show that almost 50% of domestic consumption

is covered by imports. Consumption of pork was relatively stable; fluctuated between 560 and 580 thousand tonnes. In Slovakia, the situation is very similar to the Czech Republic. Degree of self-sufficiency ranges between 45 and 68%. Two main factors of poor results were observed. First, we observed significant decline in production between 2006 and 2012; total production decreased from 118 to 77 ths. tonnes. Since than production seems to be relatively stable. On contrary to production, consumption evince an increasing trend since 2013. While in 2013 consumption was 133 ths. tons, in 2016 the total consumption was already 167 ths. tonnes. Two opposite tendencies caused that the degree of self-sufficiency dropped to only 45% in 2016.

In Poland, degree of self-sufficiency fluctuates between 92 and 117% over the reference period. Fluctuations are caused by minor fluctuations in total production (ranging from 1.7 to 2.1 million tons) and total consumption (which ranges from 1.65 to 2.03 million tons). Per capita consumption of pork is rather stable. While in 2005 average Pole consumed about 39 kilograms; in 2016 it was 41.4 kilograms. Only Hungary was self-sufficient over the whole analysed period. Self-sufficiency rates range from 103-118%. Total production is approximately 300 ths. tonnes without significant fluctuations during the analysed period. In Hungary, pork is not as dominant in human diet as for example in the Czech Republic and Poland. Per capita annual consumption of pork is comparable to consumption to poultry (about 27 kg / person / year).

Figure 5 **Degree of self-sufficiency, pork (2006-2016, %)**
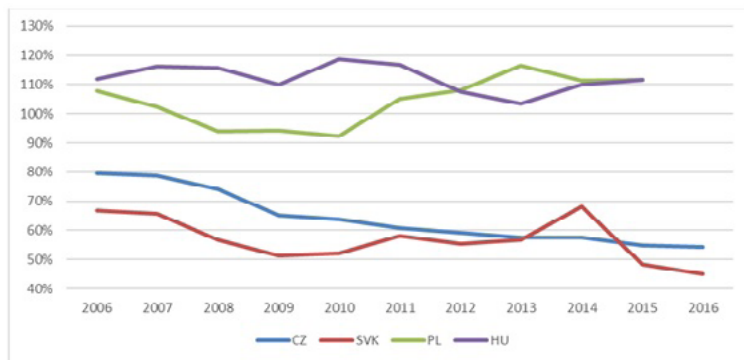
Source: Own processing based on data from CSU, KSH, GUS and SU SK.

Poultry

For poultry, the degree of self-sufficiency in the Czech Republic was only 65% in 2016. Figure 6 presents the decreasing tendency of this indicator. Poultry meat has

an important share in total meat consumption (about 35%, comparing to 57% of pork). The downward trend is caused by two contradictory factors. First, it is caused by the growth in domestic consumption. Between 2006 and 2016 total consumption increased by 18 ths. tons up to 377 ths. tonnes. Second, fall in poultry meat production was observed. During the analysed period total production decreased by 60 ths. tonnes to 247 ths. tonnes. Between 2006 and 2009, similar situation to the Czech Republic was observed in Slovakia; degree of self-sufficiency felt from 80 to 70%. However, since 2009, self-sufficiency in poultry has risen. In 2015 and 2016 domestic production was equal or larger than consumption. Improvement was pulled by the rise in domestic production, which has been growing significantly since 2011. Between 2011 and 2016, Slovakian poultry industry increased production by 18 ths. tons from 72 to 90 ths. tons. On the other hand, there is a slight drop in domestic consumption; It fell from 117 (2006) to 90 ths. tonnes in 2016. In Average annual per capita consumption was 14 and 28 kg in Slovakia and Hungary respectively. In Hungary, similarly to Poland, degree of self-sufficiency has increasing trend. Even the both countries evince similar growth rate. Hungarian self-sufficiency was improved by increased domestic production. Between 2006 and 2015, total production rose by 116 ths. tonnes to 490 ths. tonnes. Although consumption decreased by 27 ths. tonnes, fall rate was smaller to production growth rate. Total production was 283 ths. tonnes in 2015. In Poland, the degree of self-sufficiency increased from 116% (2006) to 187% (2016). This increase was mainly caused by the growth of domestic production. Between 2006 and 2016 total production doubled as it went up from 1 million tonnes to 2.14 million tonnes. Consumption of poultry meat also has a growing tendency, but it is almost negligible compared to production growth. Consumption increased 895,000 tonnes (2006; 23.7 kg per capita) to 1.14 million tonnes (2016; 27.1 per capita in 2015).

Figure 6 **Degree of self-sufficiency, poultry (2006-2016, %)**
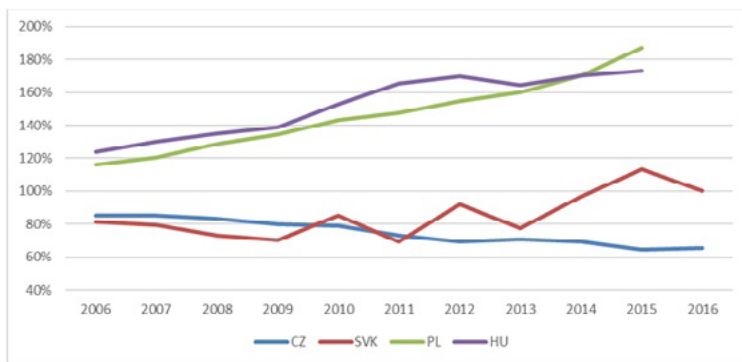
Source: Own processing based on data from CSU, KSH, GUS and SU SK.

4   Conclusion

This contribution aims to measure self-sufficiency of Visegrad countries in selected (most important) commodities (wheat, eggs, potatoes, beef, poultry and pork), characterise its direction of development and influencing factors. The results show that the Czech Republic is self-sufficient in production of wheat and beef. On the other hand, Czech Republic is unable to cover domestic consumption in potatoes, eggs, pork and poultry. In poultry or pork meat, the situation is very alarming, the degree of self-sufficiency is only 55% and 63% respectively. The situation in Slovakia is very similar to the Czech Republic. In eggs, wheat and beef; the degree of self-sufficiency is above 100%. However, in potatoes, pork and poultry meat, Slovakia does not cover consumption by domestic production. Poland, except for a few years in the case of wheat and pork, is fully self-sufficient in all other commodities evaluated. Also in Hungary, the degree of self-sufficiency is close 100% or above.

Based on the reached results, authors aim to further analyse the degree of self-sufficiency also in other commodities in all Visegrad countries. Further, deeper analyses of influencing factors is necessary, unfortunately the scope of this article did not provided enough space for Authors also aims to confirm statistically whether degree of self-sufficiency can inform about competitiveness and certain advantage in production of analysed commodities.

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SOCIAL AND ETHICS-LEGAL ASPECTS OF BIOECONOMY

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Abstract

The article discusses the ethical and legal problems of regulation of the introduction of modern biotechnology in agriculture. First and foremost is biotechnology and genetic engineering. The main objective of this study was to identify the best practices of social regulation negative effects of modern biotechnology on the basis of a comparative review of European and Russian legal regulations of food safety. The study also focuses on the risks of introduction of biotechnology in agriculture and provides general classification of them namely food, agricultural, environmental, patent, social and ethical. Based on the analysis of the best European practices, the article concludes the necessity of international quality standards on risk assessment of quality and food safety in the Russian Federation. Despite the fact that the risk assessment system is used already for some time, consumers don't always trust the reliability of the results. One explanation of this fact is that a national food safety system in the past had problems with the timely alert about the potential dangers of certain products. In many countries the reason for the rejection of certain products, the manipulation of genetically modified organisms (GMOs) can be social and ethical views. Such conflicts often reflect deeper issues relating to the interaction between human society and nature – issues that must be fully taken into account in any attempt of public communication. Proposed human expertise in the form of agrobioethics similar to bioethics in biomedical technology is understood as a mechanism of social control and regulation of the new «life systems" in the Bioeconomy.

Keywords: *bioeconomy, biotechnology, genetic engineering, risk, law, bioethics, agrobioethics.*

JEL Classification: *O13,O33, Q16*

1   Introduction

Global challenges and strategic socio-economic priorities for the future of Russia and its regions, has led to the need to expedite the study, forecasting and design tools that should contribute to the sustainable development of rural areas, to ensure the safety and quality of life, protect the environment and improve environmental management. The Rome Declaration of the world forum for food security from 13 — 17 November 1997 defined the concept of food security as "access of all people at all times to the food needed for a healthy and active life".

The agriculture in the 21st century faces multiple challenges: it has to produce more food, feed and fiber for a growing population with a smaller rural labour force, more feedstock for a potentially larger market of bioenergy, it should contribute to the overall development in dependent on agriculture for developing countries should apply more efficient and sustainable production methods and adapt to climate change (Ron Johnston, 2011). Food security from the point of view of any state is the ability of the state regardless of external and internal threats to the population's needs in food in quantities, quality and the assortment corresponding to accepted standards and safety regulations.

Key issue:
1. Whether our food is safe in terms of application of new biotechnologies?
2. What measures should be taken in the convergence of the global food market for the standardization, regulation and security of the consumer?

The main problems of food safety:
1. Low-income citizens are forced to give preference to cheap (and often falsified) and substandard food.
2. The trend of a General decline in quality of food and the increase of anxiety to the production of food using genetic engineering.
3. The increase in revenues of genetically modified foods (GMOs) and products thereof: soybeans, corn, canola, rice, potatoes, pumpkin, papaya etc.
4. The proliferation of intellectual property rights on genetically modified seed and breeding material of large transnational corporations (TNCs).
5. Low level of awareness of both the farmers and consumers about the standards of food safety.
6. A large number of legal regulations, international and domestic (more than 300).
7. The complexity of harmonization of the requirements for the competitiveness and high standards of food safety.

The main objective of this study was to identify the best practices of social regulation negative effects of modern biotechnology on the basis of a comparative review of European and Russian legal regulations of food safety.

1.1 International policy and system standards to ensure food safety: brief overview

In 2005, Organization for economic cooperation and development (OECD) in the framework of the International programme for the development of the future launched a project on "Prospects of development of Bioeconomy 2030"(OCED, 2009. The main prerequisites for the development of the Bioeconomy in a global scale are:

– population growth, its per capita income and educational level, primarily in developing countries, where, according to forecasts, in 2030 will accommodate 97% of the 8.3 billion people on the planet;
– increase in energy demand combined with the need for measures to reduce the greenhouse effect;
– population ageing in the EU, BRIC, and the growing demand for food, the production of which will use transgenic plants and animals.

At the international level, the World trade organization (WTO) is responsible for developing regulations concerning the hygiene and safety of food products. The agreement on sanitary and phytosanitary (SPE-agreement), which concluded WTO members, includes a wide range of activities relating to the protection of people and animals from diseases associated with the consumption of food products. The Europe Union (EU) law reflects its obligations to the WTO and meets the requirements of the Commission "Codex Alimentarius", if appropriate (Sadik et al, 2016). In each member state of the EU is responsible to independently monitor the compliance with EU directives. The directives also establish General principles of control, sampling and inspection of food products. Member States are only obliged to inform the European Commission about their activities for control.

European legislation concerning food products can be divided into the following three main components. Legislation concerning food safety, which covers areas such as hygiene, food products, food additives, materials in contact with food products, new food products, and control systems. The second family of laws applies to information for consumers, which mostly seem to be on the labels. The third family of laws establishing quality requirements aimed at protecting the quality and comprises "vertical" directives, i.e. directives for dairy products, dietetic products and specific products produced in certain regions (European Commission Directives, 2000, 2002, 2012, 2014) .

Over the past 15 years developed new approaches and new principles of the international system standards to ensure food safety, namely:

1. The principle of "From farm to table" - a systematic approach, the control parameters of food safety at all stages of production — from receipt of raw materials to product use by the end user. The concept "From farm to table" is an integrated system of quality control of food and feed, traceable at all stages of production and delivery of food products. Safe products are the foods that do not pose a risk to the health of humans and animals.

2. The principle of "Traceability" in the production chain of feed and food. "Traceability" - a systematic approach, the control parameters of food safety at all stages of production — from receipt of raw materials to product use by the end consumers.

   The main mechanisms of quality assurance and food safety in the WTO are the Code of Alimentarius and Hazard Analysis and Critical Control Points (HACCP) (Van der Meulen B., 2010). The Code of Alimentarius (Codex) is an international system of standards, which aims to ensure food safety and the removal of barriers to world trade.

Principle of construction:
– minimum of security requirements that can support the even poorer countries;
– build product groups in accordance with the practice and features of world trade in specific goods; - the principle of reliance on vertical standards;
– the unity of requirements to the construction standards (the unity of form);
– the unity of the rules of standards development (control from one center).

Requirements:
– make up products and raw materials, food hygiene;
– additives, residual pesticides, pollutants;
– packaging requirements, labels, distribution;
– advertising;
– methods of analysis and sampling and other at all stages of the food chain "from farm to fork" for

   Europe and other countries accepting the requirements of Codex Alimentarius.

Russian legislation in the field of food safety has the following structure and quantitative parameters:
1. In the field of veterinary surveillance (39 of which 10 Federal law).
2. In the field of phytosanitary control (36 of them 5 of the Federal law).

3. In the field of safe handling of pesticides, agrochemicals and seed control (25 of them 3 Federal law).
4. In the field of consumer protection and the environment (22 of them 3 Federal law).

Total: 120 major legal documents, not including technical regulations and sanitary rules! (Sadik et al, 2016).

2   Data and Methods

When performing this study, we used the analysis and review of the international and Russian normative legal acts, regulating the standards and norms of food safety in terms of the development of the Bioeconomy (Garcilazo, E., 2014). Following methods were used: system analysis, historical retrospective, comparative.

Aachievements of biology, biochemistry, plant breeding, genetics, microbiology mean a real revolution in agriculture - biotech. Its achievements are the new means of production, innovative technologies as integral elements of the zone systems of agriculture, genetic engineering. Gene or genetic engineering is fundamentally different from the selective breeding involved in methods to create varieties and hybrids of plants, crops and animal breeds. The task of genetic engineering is to obtain the desired qualities of a modified or genetically modified organism. Unlike traditional breeding, in which the genotype is only indirectly altered, genetic engineering allows direct intervention in the genetic apparatus using molecular cloning techniques. When entering into the body (it can be a plant, an animal, a micro-organism and a person) new genes can give it a new desirable characteristic, which he had never before. Organisms that have undergone genetic engineering are called GMO (genetically modified organism).

One of the important tasks of genetic engineering in agriculture is to obtain plants that are resistant to viruses, since currently there are no other ways to combat viral infections of crops. The introduction of the virus shell protein genes into plant cells makes plants resistant to this virus. Currently obtained transgenic plants capable of resisting the effects of more than a doesn't different viral infections. Another important task of genetic engineering relates to the protection of plants from insect pests. The use of genetic engineering in agriculture has reduced the use of insecticides by 40 - 60%. In other words, the production of genetically modified organisms (GMOs) increases the yield of cultivated plants and the productivity of farm animals. All this increases the possibility of solving the problem of food in the world and becomes a way of reducing the price of food.

However, the use of GMOs, despite the wide and rapid spread, is a legitimate concern. Some experts, while not denying the vast potential of agricultural

biotechnology in food production, at the same time, warn that the benefits of biotechnology should not be valued too high, and in determining its role in global agricultural production should not fall out of attention of potential negative consequences. Scientists fear that the use of seeds derived from biotechnology may result in the loss of genetic diversity among crops, as indigenous species can be replaced in the same way as modern hybrids have replaced many traditional varieties or breeds. Movement towards genetic homogeneity can lead to greater plant susceptibility to many pests, diseases or other negative environmental impacts, problems that are the scourge of monoculture farming. There are also ethical problems associated with the transformation and introduction of genes of one species of plants or animals in the genetic apparatus of another species.

European Group on ethics have stressed the need for an integrated perspective and approach to the agrarian technology so that when the ethical impact assessment of the new technology took into account the aspects of production, storage and distribution. The main objectives, such as food security, food safety and long-term use (persistence), in her view should be adopted as the main priorities and principles on which each technology in agriculture should be equal.

Systematizing the GMOs risks, we can suggest their classification. The basis for the classification is the level of possible harm and safety for the key components of the food market: food, environment, agriculture, consumer health, the right to change and the possession of new natural objects. This risk classification can be used to develop measures to prevent the impact of possible threats from the introduction of GMOs in agriculture.

Food risks:
- direct effect of toxic and allergenic proteins in transgenic GMOs.
- risks, indirect pleiotropic effect of transgenic proteins on the metabolism of plants.
- risks, mediated by the accumulation of herbicides and their metabolites in resistant varieties and species of agricultural plants.
- risks of horizontal transfer of transgenic constructs in the first place in the genome for symbiotic human and animal bacteria (E. coli, Lactobacillus (acidophillus, bifidus, bulgaricus, caucasicus), Streptococcus thermophilus, Bifidobacterium, etc.).

Environmental risk:
- reduction in varietal diversity of crops as a result of widespread application of GMO derived from a limited set of parent varieties.
- uncontrolled transfer of structures, especially in determining the different types of resistance to pesticides, pests and plant diseases, due to re pollinate with

related wild and ancestral species. In this regard, reduction of biodiversity of wild ancestral forms of cultivated plants and the formation of "super weeds".

- risks of uncontrolled horizontal transfer of structures in the rhizosphere microflora.
- a negative impact on biodiversity through the defeat of the toxic transgenic proteins non-target insects and soil micro flora and violation of the trophic chains.

Agronomic risks:
- unpredictable changes of non-targeted properties and characteristics of modified varieties, are associated with pleiotropic effect of the gene introduced. Ex.g., reduced resistance to pathogens during storage and resistance to critical temperatures during the growing season in cultivars resistant to insect pests.
- deferred property changes, after a few generations associated with the adaptation of a new gene of the genome and as a new manifestation of pleiotropic properties, and the change is already declared.
- the inefficiency of transgenic pest resistance after a few years of mass use of this variety.
- use by terminal manufacturers to monopolize seed production.
- Social risk:
- growth unequal distribution of income of specific agricultural producer and owner of patents for modern biotechnology.
- decline in food quality and availability.

Ethical risks:
- use of seeds, biotechnology-derived products, can lead to loss of genetic diversity of agricultural crops.
- the movement toward genetic uniformity can lead to higher susceptibility of plants to many pests, diseases or other negative impacts on the environment.
- there are ethical problems associated with the transformation and implementation of genes of one species of plant or animal into the genetic apparatus of a different type.

Patent risks:
- Six years ago, Monsanto sued by 75-year-old farmer from Indiana, Vernon Hugh Bowman for patent infringement for seeds and won. But the farmer did not leave the matter and went to the end of February 2013, the U.S. Supreme court.
- As of January 2013, Monsanto filed 144 law suit against 410 farmers in 27 States. According to the report, released last week by the centre CFS (Center

for food safety), for many years, Monsanto is spending huge resources to "watch" and to sue farmers: 75 employees and a budget in 2003 — $ 10 million per year. The authors of the report also indicate that by the end of 2012, Monsanto had received from farmers and agricultural businesses more than $423,5 million dollars for patent infringement.

3 Results and Discussion

Over the last three years the import of genetically modified products in Russia has grown three times. But in most cases they are issued for products "of natural origin". According to the Institute of nutrition in 1998, cases of use of GMOs in the production of products were isolated. However, currently the Russian market is experiencing a real expansion of genetically modified foods. According to Russian legislation, products containing from 5% components GMOs must be labelled accordingly. But, according to Greenpeace, many manufacturers are considered. One of the main reasons for this is the absence in Russia of a system of control over the use of GMOs in food products. There are no laboratories able to the extent necessary to carry out quantitative estimation of GMO content in food products; there are no approved methods, no means for implementing continuous monitoring. In the end, consumers suffer: they don't have all the necessary information about the foods that you acquire. According to the Institute of Nutrition and Research Institute of the Meat Industry, currently in Russia there are no standardized methods of quantitative determination of GMOs in the finished food. Authorized laboratories of Sanitary-epidemiological services can provide only a qualitative analysis of food (European Commission Directives, 2000, 2002, 2012, 2014).

Given the global nature of the agricultural sector of the Bioeconomy, a special urgency today is the international cooperation in the field of legal and ethical regulation of the development and implementation of biotechnology.

The benefits of adopting international food safety standards are:
- provides consumers with the necessary guarantees for food safety;
- recognition from consumers;
- achieve greater conformity with the international requirements, which is especially important in the conditions of WTO;
- use of world experience in the field of management systems food safety;
- the transition to the new level of production culture, thought, and labour discipline;

- foreknowledge of potential threats to product safety and the use of preventive measures, instead of the late action of rework and recall products; a systematic approach, the control parameters of food safety ("from farm to table»);
- reduce costs associated with production defects;
- the market expansion of products, including its implementation in foreign markets;
- additional competitive advantages in tenders and competitions;
- increase of investment attractiveness;
- the creation of a manufacturer's reputation quality and safe food product;
- to increase the confidence of suppliers and the advantages in getting orders from other companies.

Discoveries made in recent years in the field of Life Sciences, are seen by experts as a convincing proof that the XXI century will be the age of biotechnology, which, in combination with nanotechnology and bioinformatics, will fundamentally change existing approaches to the creation, production and consumption of products, and ultimately, will form the Foundation for sustainable growth on a global scale, for complex changes in the economy, society and politics. However, they give rise to legitimate fears in terms of safety for human health and the environment. First, it refers to genetic engineering, which can bear certain risks (F. Nezhmetdinova, 2014). For Russian consumers the presence of these risks is complicated by the following circumstances:

- In Russia approved documents somewhat later than in the countries of the European Union in the field of legal regulation of the production of GMOs.
- In Russia there is no special Federal law governing GMOs. There are not enough trained specialists for the supervision of GMOs.
- In Russia there are no wide professional discussion in the medical community of the problem of GMOs.
- The existing country documents does not require large-scale and long-term studies on the safety of GMOs, but also the environmental consequences of GMO use
- It should be added that the existing regulatory framework provides a deliberate legal bias in favor of producers of GMOs.

The last quarter of the 20th century and the beginning of the 21st gave rise to a specific phenomenon, which German sociologist Ulrich Beck have termed "the other modern" or "risk society" (Beck U., 1999). However, as noted by P. D. Tishchenko, the specificity of the social context of biotechnology is historically uncertain, when science and society, social phenomena and people are constantly experiencing ourselves in the attempts of self-identification and thus are constantly

changing, becoming other (P. D. Tishchenko,1994). These changes create a "constellation of opportunities" that confronts a man chose a certain line of development of the many possible ways (Nezhmetdinova F., 2013). And here, rightly, in our view, emphasizes the changing meaning and use of the concept of "risk", which, first, from the category, only personal space moves to the global level. Second, if in the previous century, risk was seen as the result of insufficient development of technologies and scientific knowledge, today, the risk arises where there is redundancy of technological and scientific progress (Nezhmetdinova F., 2013).

Understanding these risks brings us closer to awareness of the increasing relevance of humanitarian expertise in the form of bioethics. Currently bioethics on the one hand it recognized the scientific interdisciplinary knowledge, the subject of which is evaluation and selection of the moral criterion of relationship to the living. On the other hand is approved by the world community of social practice of ethical regulation of research and first clinical studies, the introduction of modern NBIC-technologies in economy and production (Nezhmetdinova F., 2013).

It is also needed a work in the direction of more coordinated ethical review of the application of modern food biotechnology and GMO foods. This will help the analyses of risks and benefits to human health and the environment, assessment of socio-economic factors, including intellectual property rights, as well as in the consideration of ethical aspects. As a result it will increase the relevance of the experience of bioethics to increase its social value and new forms. One of these areas of development may be agrobioethics understanding as a mechanism of social control and regulation of the new "financial viability" in the Bioeconomy (F.Nezhmetdinova, 2010).

Agrobioethics is a new approach to resolving ethical dilemmas that may arise in daily practice the application of new technologies in agriculture. It is skills of dispute resolution, emotional intelligence, interpersonal and social communication how to resolve differences between producers and consumers of agricultural products of the state and civil society. The goal is it to reach consensus, based on the health and safety of the consumer, taken by all the defendants, and consistent with the laws and principles of bioethics (F.Nezhmetdinova, 2010).

4 Conclusion

It becomes obvious fact of the need to bring to the analysis and development of standards for the safety assessment of the introduction of modern technology in agriculture additional tools, such as agrobioethics. The main problem of agrobioethics related to GMOs is conflict of rights and interests of producers and consumers of GMOs. In reasoning about positive and negative aspects of GMO

technology is not to yield to emotions and to make unsubstantiated conclusions, accusing the biotech company that they are "cashing in on human misery" or trying to destroy the natural ecosystem and to "turn the earth into a desert." However, it should be remembered that uncontrolled use of such powerful techniques can indeed lead to negative consequences, and necessary, as in any issue, to find some "middle ground". The control over the activities of biotech companies should involve independent experts, scientists and government officials; work on creation and introduction on the market of genetically modified crops should be highlighted in the press, often because of fear of GMOs occurs exclusively due to the low awareness of the population and has no real Foundation.

The practice in modern democratic societies, shows that these discussions are absolutely necessary not only for a more complete understanding of all the "pros" and "cons" of applying the methods of invading privacy rights at the level of genetics. They also allow us to discuss the ethical aspects and to determine long-term effects of applications of biotechnology, which in turn, helps legislators to create an adequate legal base regulating this sphere of activities in favour of the protection of individual rights. It is possible to create the Ethical committees of agrobioethics which similar to ethical committees in the field of medical clinical trials (Nezhmetdinova F.T., 2010).

Given the global nature of bio-economic development, of particular relevance today is international cooperation in the sphere of legal and ethical regulation of the development and implementation of biotechnology. An important place in this cooperation belongs to the bioethics, which has considerable positive experience of interdisciplinary dialogue and practice. Successful development of the Bioeconomy is possible only in conditions of confidence of its safety and usefulness, like the life of a specific person, and for the planet as a whole.

Acknowledgements

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RISK MANAGEMENT IN AGRICULTURE AND AGRARIAN POLICY

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Abstract

The experience of private-state-public risk management schemes in the part of farmers' revenue and income assurance programs in countries the main world exporters of agricultural product has been overviewed. To evaluate economic background for crop revenue and income assurance programs in Ukraine the correlations between the production fluctuations (yield) and prices, revenues, profit from grain crops were calculated. The meanings of coefficients of correlations testify chaotic fluctuations of price and production results, strong influence of the macroeconomic factors on the prices and financial results of agricultural producers in the emergence economy. There was concluded, that under such conditions the revenue and income assurance programs better, than yield insurance programs, catch falls of natural, market and macroeconomic environment to provide sustainability of agriculture.

Keywords: *agrarian policy, agricultural enterprises, insurance, price, profit, revenue, risk management.*

JEL Classification: *H5, M110, Q1, P32*

1   Introduction

Agriculture is well known as high risky area of business. There are a lot of sources of risks for farmers: weather and climate changes, plant diseases, insects, livestock epidemics, fluctuations of prices, terms of credit, government regulations. The European Association of Agricultural Economists confirms: "In the last years it has become obvious that the previous generation of EU farmers grew up in a relatively stable risks environment but the current and next generations are confronted with an increasing number of risks" ("Prospects for agricultural insurance in

Europe", 2016). It is should be noted that risks in agriculture transform into risks of food safety, social and political stability, rural development, sustainable development.

The 2030 Agenda for Sustainable Development, adopted at the United Nations Assembly in 2015, defines core 17 Sustainable Development Goals (SDGs) for "a plan of action for people, planet and prosperity". Experts of FAO stress: "As the fundamental connection between people and the planet, sustainable food and agriculture are at the heart of the 2030 Agenda" ("Food and Agriculture", 2016). But the rapid changes in the world are transforming into more extreme and frequent fluctuations in agricultural production conditions, agri-food markets. Achieving the transformation to sustainable agriculture has become a major challenge.

Due to the estimates of M. Miranda and J. Glauber (1997), a portfolio of geographically diversified contracts of crop insurance was much as twenty times riskier than a portfolio of conventional health or automobile insurance contracts. The private and public schemes of risks reduction for farmers were developed and introduced in many countries – leaders of agricultural production and export. Updating of risk management schemes is important direction on the way to sustainable agriculture and SDGs achievement under conditions of modern challenges.

Ukraine with rich resources potential of agricultural and food production, 40% of export of agricultural and food products in total value of merchandise export has opened up agricultural risk management technologies neither at micro-level nor at macro-level. PSE is still lowest among European countries; this indicator of state support of farmers was even negative last years. In 2015 PSE was estimated -2.23% of GDP and -9.5% of GFR ("Producer and consumer support estimate data", OECD, 2017). The Law of Ukraine "On State Budget of Ukraine for 2018" allocates 945 million UAH (€ 27,8 million, €1.4 per hectare) for financial support of agricultural production and 66 million UAH (€ 1.9 million) for partly reimbursement of interest of credits, but this support does not include risk management programs.

The risk management schemes have to include wide range of sources of risks in agriculture, tools of its reduction. This paper is aimed to summarize modern experience of risk management in the part of farmers' revenue and income assurance in the state programs in the countries, that are the main world exporters of agricultural product, and to evaluate economic background for crop revenue and income assurance programs in Ukraine.

2   Data and Methods

The research is based on the overview of legal framework of agrarian policy in the USA, EU, Canada, Ukraine; analytical reports of FAO, OECD, the Institute for the Protection and Security of the Citizens.

The survey of production and commercial results of some agricultural enterprises (farms) of Kharkiv region (Ukraine) was carried out. The statistical reports and financial statements of these enterprises, the Bulletins of State Statistical Service of Ukraine on results of production and sales of agricultural product (2011-2015) were analyzed.

Logical operations, surveys of agricultural enterprises, statistical data collection and analysis were used. The correlation analysis has been implemented for revealing connections between production fluctuations and prices, revenues, profit from grain crops. This analysis dealt with the level of enterprises, as well the level of national agriculture. The scope of the fluctuations was defined by means of variation indicators. The fluctuations of production results were considered on the base of the fluctuations of the crops yield. Dynamic of crop yield was chosen for evaluation of production fluctuation since it better reflect production risks and give possibilities to avoid the influence of the changes of sowed area due to famers' decisions on the results of production (in comparison with the amount of production). For calculations, data systematization Microsoft Excel was used.

3   Results and Discussions

New challenges gave rise the special attention to risk management as the monitoring, identification, assessment, and activities to direct, coordinate and control the systems with regard to minimize probability and/ or impact of unfortunate events or to maximize the realization of opportunities (ISO 31000). EAAE put the question, whether agricultural policy should further develop into a risk management policy (2015).

In the USA the Agricultural Act of 2014 offered two new government programs – Price Loss Coverage (PLC) and Agriculture Risk Coverage (ARC) for American farmers. Price Loss Coverage Program works like insurance for farmers in the case of prices reduction, and government takes some market risks of farmers. But the market price mechanism works such way that reduction of prices often is a consequence of the growth of supply and vice versa. It is fairer for public institute to take private risk exactly due to the market failure in the provision of fair income for producers. In this case the state programs targeted to

the compensation of farmers' income losses may better mend market inefficiency than programs connected to the price fluctuations.

The relationship between yield and market prices is important factor for grounding of income stabilization and insurance programs. C. Zulauph (2002) calculated coefficient of correlation between average annual prices and average annual yield of some crops in the USA for 1986-1999. He confirmed the tight negative correlation between average annual prices and crops yield. So under tight negative correlation reduction of yield is compensated by price growth. Such conclusions have built the theoretical basis for implementation of revenue assurance programs in the USA in the early 2000.

Due to the Farm Bill of 2014 producers participating in Agriculture Risk Coverage (ARC) Program may choose county-based or individual coverage. For producers choosing county-based ARC, payments are provided when county crop revenue drops below 86% of the county benchmark revenue. Special part of the US Agricultural Acts is "Crop insurance".

The investigation of the practice of agricultural insurance in the USA has showed, that the wide range of the insurance products is offered by many private insurance companies. They work in agreement with the USDA Risk Management Agency. About 45% of field crops production value were insured (23% in the EU) ("Agricultural Insurance Schemes", 2006). The yield insurance covers many risks of crop production in the US. There have been also developed and introduced revenue and income insurances. Revenue insurance combines yield and price insurance. Income insurance takes also into account the costs of production.

The amount of premium and indemnities due to the insurance programs for the producers of some crops in the USA in 2014-2015 are in the Table1. These data testify that the indemnities cover the paid premium in some years. The premium subsidies amounted 58% of total premiums.

Table 1 **Amount of premiums and indemnities due to crops insurance programs in the USA**

Crop	Year	Premium, 1,000 dollars	Indemnities, 1,000 dollars
Barley	2014	53,410	61,401
	2015	69,085	37,329
Corn	2014	3649,571	3842,778
	2015	3685,913	1677,587
Sunflower	2014	344,517	757,076
	2015	306,477	428,374

Crop	Year	Premium, 1,000 dollars	Indemnities, 1,000 dollars
Wheat	2014	1453,541	1643,091
	2015	1284,514	1218,538

Source: NASS, USDA, 2017.

In Canada insurance income program (Canadian Agricultural Income Stabilization, CAIS) substituted two former programs: NISA or Net Income Stabilization Account and CFIP or Canadian Farm Income Program. Due to the CAIS farmers put an amount of money every year in the individual stabilization account, which they can withdraw in a year of big losses. A share of funding in the case when producers need to make withdrawals from their accounts is paid by government. The subsidies from the Federal and the provincial governments consist 66% of the premiums of insurance programs.

Special example of institute of market risk reduction is the Canadian Wheat Board (CWB), which is aimed to ensure the most profitable for farmers' grain prices and competitiveness of Canadian wheat and barley and so to reduce market risks for producers.

The set of Regulations and Multiannual Financial Framework were adopted in the 2013-2014 and provided guidelines and rules of the next stage of CAP of the EU. The EU practice includes agricultural insurance or/and mutual fund schemes to help farmers manage yield and price risk. It was also authorized the use of EU funds to support innovative insurance products such as area-based yield index insurance or weather index insurance. The total amount of agricultural insurance premium in the EU was estimated around €1.5 billion per year, with public subsidy of approximately €500 million. The average amount of insurance indemnities was near €1.1 billion ("Risk Management and Agricultural Schemes in Europe", 2009). The perspectives of income stabilization programs in the EU are argued by many scientists (El Benni, N., Finger, R. and Meuwissen, M.P.M., 2016).

So, in the USA, EU, Canada the private, state and public endeavors insure and divide the burden of agricultural risks, provide stabilization of farm income, insurance programs are designed to cover the production risks associated with the uncertainty of weather conditions, and risks of fluctuations of farmers' income.

In spite of high level of risks of agribusiness insurance in agribusiness in Ukraine has not developed: there is limited range of insurance products, insurance premiums are high, very small insurance coverage of agricultural land. In 2015 there were insured 869 thousand hectares (4.2% of land of agricultural enterprises or 2.4% of land of agricultural enterprises and individuals). More than

a half of total amount of agricultural insurance contracts is the contracts of bank collateral. The rate of indemnities was from 9.7% in 2015 to 50.9% in 2012.

The Law of Ukraine "On State Support to Agriculture" (June 24, 2004 # 1877-IV) announced the creation of the Fund for Agricultural Insurance Subsidies of Ukraine (FAIS) and the provision of compensation of 50% of insurance premium paid by agricultural producers. The Law of Ukraine "On the State Budget of Ukraine for 2005" (February, 23, 2004 # 2285-IV) provided allocation of UAH 54 million as a subsidies to reduce the cost of insurance premiums actually paid by agricultural producers, but only UAH 5.8 million of them were used, that is, the volume of insurance coverage turned out to be less than expected, and in 2006 the state subsidies of agricultural insurance were set at UAH 10 million. In 2010 the state program of subsidies of insurance premiums was stopped and has not renewed in spite of its positive influence on the development of agricultural insurance.

Most widely extended crop insurance is related to yield losses. New insurance product design, state programs of assurance of farmers' incomes development should be based on the analysis of production and market fluctuations. It is clue question concern the degree of market ability to mend the production falls, their influence on the revenue and farmers' income and respectively their financial possibilities to continue produce vital important for food security products.

Grain production is a base of Ukrainian agriculture. More than 50% (55% in 2015) of total sowed area is under grain crops, mainly wheat and corn (Table 2). This fact caused the focus of our investigations in the grain production, first of all, wheat and corn production.

Table 2 **Sowed area under crops in Ukraine, thousands hectares**

Year	Total	Grain	Wheat	Corn
2011	27670	15724	6499	3620
2012	27801	15449	5534	4625
2013	28329	16210	6684	4893
2014	27329	14801	6061	4691
2015	26902	14739	6867	4123

Source: Data of State Statistical Service of Ukraine.

The grain yield is extremely unstable in Ukraine, but demonstrates good growth after 2007. The differences between maximum and minimum levels of average year yield for last ten years (2007-2016) were 2.1 times for grain crops, 1.8 times

for wheat, 1.7 times for corn. Figure 1 demonstrated yield fluctuation for grain, wheat and corn in Ukraine.

Figure 1 **Grain yield in Ukraine, centners per hectare**
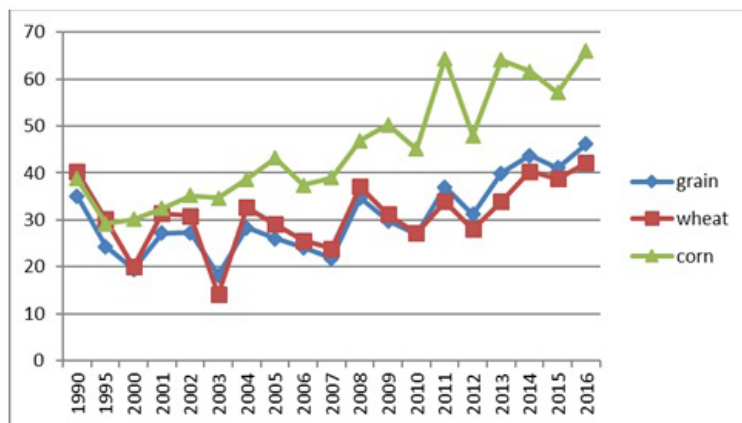
Source: Data of State Statistical Service of Ukraine.

In spite of new technologies of last decade variation of grain yield still be very high in Ukraine. The results of calculations of the coefficients of variation of average annual grain crops yield prove this fact (Table 3). The coefficient of variation of grain crops yield did not become lower in 2008-2016 in compare with 2002-2007.

Table 3 **Coefficient of variation of average annual grain crops yield in Ukraine**

Crops	2002-2007	2008-2016
Grain	0,159381	0,179030
Winter wheat	0,246941	0,152739
Corn	0,113616	0,150882

Source: Author's calculations.

Risks of losses due to the yield fluctuation might be compensated by prices changes. The correlations between grain crops yield and prices, revenue from sales and profit were checked for some agricultural enterprises of Kharkiv region for 2011-2015. The results of calculations are in Table 4. No one of coefficient of correlation of Table 4 confirms tight inverse connection between yield and prices, yield and revenue from sales, yield and profit from sales of grain crops.

Table 4 **Coefficient of correlation between average annual yield and prices, revenue and profit from sales of grain and leguminous crops, wheat, corn of some Ukrainian agricultural enterprises in 2011-2015**

Enterprises	Crops	Coefficient of correlation between		
		yield and prices	yield and revenue from sales	yield and profit
1. Agroprogress	Grain and leguminous crops	0,68437	0,87603	0,51246
	Wheat	0,50882	0,78368	0,49227
	Corn	-0,61574	0,73689	0,02874
2. Profagro	Grain and leguminous crops	-0,24134	0,55171	0,15776
	Wheat	0,38424	0,23714	0,65954
	Corn	-0,31178	-0,96330	0,85132
3. Promin	Grain and leguminous crops	0,51911	0,70825	0,69254
	Wheat	0,96272	0,82720	0,85792
	Corn	0,25914	0,33698	0,42235

Source: Author's calculations.

Actually agricultural enterprises are working under conditions that close to pure competitions and no one of them can influence on the market prices and supply. We have tested the correlation between the average year grain crops yield and prices, revenues and profit from these crops sales in Ukraine for 2011-2015. The results of calculations are in Table 5.

Table 5 **Coefficient of correlation between average yield and prices, revenue and profit from sales of grain crops, wheat, and corn in Ukraine in 2011-2015**

Crops	Coefficient of correlation between		
	yield and prices	yield and revenue from sales	yield and profit
Grain and leguminous crops	0,35402	0,44083	0,38850
Wheat	0,60380	0,61788	0,74195
Corn	-0,23885	-0,18221	-0,17909

Source: Author's calculations.

Due to these calculations the slow direct connection are observed between yield and prices, yield and revenue from sales, and yield and profit for wheat. The coefficients of correlations for grain crops and corn do not confirm any connections between yield and prices. So, another, than crops yield, factors affected stronger on the prices fluctuations (Figure 2) and revenues of farmers in this period.

Figure 2 **Average annual grain crops prices in Ukraine, UAH per ton**
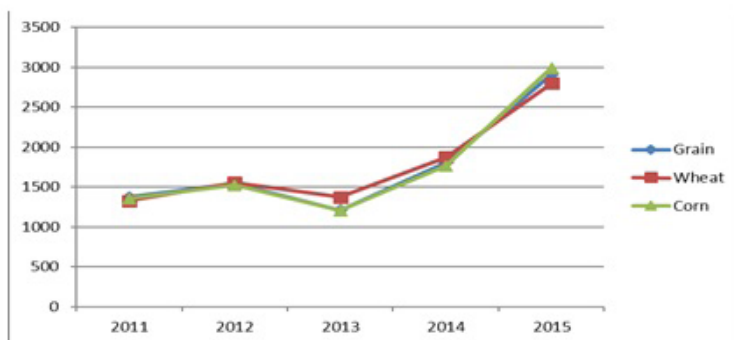
Source: Data of State Statistical Service of Ukraine.

Prices of grain of Ukrainian enterprises moved mainly due to inflation in the national economy, world market prices and dynamics of exchange rate. In spite of economic crises in Ukraine, GDP reduction after 2013 agricultural enterprises generated profit, 88.9% of agricultural enterprises in 2015 got net profit.

Also there have been revealed tight correlations between grain yield in some agricultural enterprises and average in the Ukraine in 2011-2015 (Table 6).

Table 6 **Coefficient of correlation between grain yield in selected agricultural enterprises and average in the Ukraine in 2011-2015**

Enterprise	Coefficient of correlation
Agroprogress	0,74909
Profagro	0,82967
Promin	0,91158

Source: Author's calculations.

This fact testifies that common factors (weather, macroeconomics conditions) influenced on the grain yield of selected for survey agricultural enterprises, and

grain yield was less depended on specific factors (for example, management of enterprises). So these enterprises faced mainly with systemic risks of yield reduction.

4 Conclusions

It is reasonable, and the experience of developed countries confirms that the risks of agricultural production has been taken by all society on the base of PSPP (private-state-public partnership) in the provisions of assurance schemes in agriculture, whose main participants are agricultural producers, state, insurance and loss adjusters agencies, mutual funds, professional unions and organizations. Income stabilization programs provide compensation of market failure more efficiently than many other insurance programs.

In Ukraine risk management programs, including revenue and income insurance programs, have not been implemented at the level of producers, at the level of mutual funds, producers unions, and at the level of state. The construction of the efficient agricultural risk management system needs the development of institutional framework and its functional contents. The design of diversified portfolio of insurance products, including revenue and income insurance, will contribute to the efficient agricultural risk management system.

The received meanings of coefficients of correlation between average annual grain yield and prices, revenue, profit testify chaotic fluctuations of price and grain production results at the enterprises and national levels in Ukraine in 2011-2015, strong influence of the macroeconomic factors on the prices and financial results of agricultural producers in the emergence economy. Under such conditions the revenue and income assurance programs better way catch falls of natural, market and macroeconomic environment to provide sustainability of agriculture.

For the development of the efficient private-state-public revenue and income insurance schemes for crops production the investigation of relationships of results of production of other agricultural products, prices, farmers' incomes has to be done, the theoretical ground for the reference prices, that give possibilities to catch market failure more precisely, has to be built.

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DEVELOPMENT OF SELECTED PRODUCTION-ECONOMIC INDICATORS OF RAPE GROWING IN SLOVAK REPUBLIC

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Abstract

Under the Slovak climatic conditions the oil crops represent the second most important group of crops grown on the arable land. Out of the total area of oil crops the rape comprises the largest territory. The reason is its universal utilization, not only in the food industry but also in the production of biofuels. Rape ranks among the most significant export agricultural commodities. The objective of the paper is the comparison of the production-economic dependences in rape growing in the Slovak Republic. This paper is based on the available materials of the Research Institute of Agricultural and Food Economics in Bratislava in the period of 2009 - 2015. We analyze the rape production from the aspects of cost incurred, yields, prices and subsidies. Consequently, we evaluate the economic relationships such as revenues, cost effectiveness, rate of subsidies in the refundment of costs and break-even points.

Keywords: *biofuels, break-even points, effectiveness, food industry, rape.*

JEL Classification: *Q12, Q 13*

1   Introduction

The oil crops rang among the arable crops grown for the production of oilseeds and they also serve as the raw material for the production of the vegetable oils. Apart from the human nutrition, the products of oilseeds are also used in the

pharmaceutical and cosmetic industry as well as the raw materials for the production of lubricants and biodiesel. The processing of oil crops creates the byproducts - seed cake, pressed pieces and macerated groats which present biologically valuable proteinous raw material for the production of fodder mixtures. The importance of these products is rising along with the reduction or elimination of some concentrate animal fodder. The placement of the individual species of oil crops in the world is different. While the European countries focus predominantly on the production of oil-seed rape, and particularly also on sunflower, in the world the most widespread crops are soya, cotton and peanut. The USA and China have the largest areas of soya, sunflower is grown mostly in the states of the former Soviet Union, Argentina, Romania and Turkey. Poppy seed is grown mostly in Turkey, Hungary and the states of the former Yugoslavia. The characteristic phenomenon for the growing of oil crops in the world is the expansion of production areas, and consequently the production of oil products.

In our agriculture the oil crops play a significant role thanks to their versatile usage. In the sowing structure they rang among the strategical crops and they fit in the second place after the cereal crops. In 2016 in the sowing structure the oil crops were grown at the total area 253, 171 ha, which represented 18.8 % of the arable land and 13.2 % of the total agricultural land in Slovakia. In our economy these crops are the raw material basis for quite a number of food processing and secondary industry. Recently the oil crops belong to the lucrative commodities of the agrarian market. The reason is the increased media support related to the healthy human nutrition, the increased production of biofuels and also the high demand of rape and sunflower on the foreign markets.

Under the Slovak climatic conditions the most significant oil crop is rape (*Brassica napus var. arvensis*). In Slovakia it is grown in all agricultural cropping areas. From the agronomic aspect rape is the crop which requires appropriate soil and climatic conditions. It is the crop of long vegetation period which reacts positively to the nutrition and fertilization. Due to the versatile usage rape ranks among the lucrative commodities of the agrarian market. The rape grown in Slovakia is mostly used for the production of methyl ester of rape oil (MERO) and also for export. Rape is utilized less for the food purposes, the production of pellets for heating or the production of cosmetics and fodder for farm animals. In 2012 rapeseeds were the second most exported agri-food commodity from Slovakia of the export value 381, 987, 000 €. In 2016 rapeseeds fell to the 15th position with the value of 71, 063, 000 €.

2   Data and Methods

The objective of our paper is to evaluate the selected marketing and economic indicators in the process of rape growing in the Slovak Republic. The paper is based on the available materials of the Research Institute of Agricultural and Food Economics (RIAFE) in Bratislava in the period 2009-2015. In the first part we state the balance indicators of rape production and consumption. In the following part we analyse the rape production and marketing from the viewpoints of cost incurred, yields, producers` prices, revenues and subsidies. Based on these data we evaluate the economic relationships as incomes, economic results, cost effectiveness and break-even points.

In order to achieve the assigned objective we received the factual material from the public available resources of the Ministry of Agriculture and Rural Development of SR, the Research Institute of Agricultural and Food Economics and the Statistical Office of SR in Bratislava. The cost effectiveness expresses the index value which means the profit rate (loss rate) out of each euro invested into the production.

Cost effectiveness is expressed by the relation:

$$EN = \frac{Revenues}{Costs}$$

Cost effectiveness with subsidies is expressed by the relation:

$$EN = \frac{Yields}{Costs}$$

Break-even point of yield from 1 hectare (without subsidies) is expressed by the relation:

$$Ú = \frac{VN}{P}$$

Break-even point of yield from 1 hectare (with subsidies) is expressed by the relation:

$$Ú = \frac{VN}{(P + D)}$$

This point expresses the minimal rape yield per 1 hectare where costs incurred of production are equal to revenues.

Where: VN – costs incurred ($€ . ha^{-1}$)
P – exercise price ($€ . t^{-1}$)
Ú – yield ($t . ha^{-1}$)
D – subsidy ($€ . t^{-1}$).

3   Results and Discussion

We are approaching to the solving of the production-economic relationships of rape growing under the production conditions in Slovakia. The objective is to determine the development trend of rape growing in our zone with the continuing climatic changes at the territory of the Central Europe.

Table 1 **Selected information about commodity rape in SR in particular years (in ha, t.ha^{-1}, t)**

Indicator	Years							
	2009	2010	2011	2012	2013	2014	2015	Index 15/09
Harvest area	166,476	163,989	143,676	106,839	136,566	125,566	119,302	0.72
Yield	2.32	1.97	2.31	1.99	2.74	3.57	2.69	1.16
Production	386,224	323,058	331,892	212,610	374,191	448,271	320,922	0.83
Import	58, 593	95, 857	164,714	87, 170	33, 524	27, 509	41, 109	0.70
Export	185,284	177,657	265,869	91, 953	202,180	263,367	125,564	0.68
Balance	126,691	81, 800	101,155	4, 783	168,656	235,858	84, 455	0.67
Domestic consumption	260,000	240,652	240,000	207,849	205,304	213,000	236,171	0.91
MERO	180,000	170,652	210,000	177,849	200,304	208,000	209,655	1.16

Source: RIAFE Bratislava: Oil crops. Situational and perspective review, own calculations.

In the Table 1 the principal balance indicators of rape in 2009-2015 are given. In particular, they are the harvest areas, yields per hectare, production, indicators of international trade, domestic consumption and rape usage for MERA production. The rape harvest areas have been gradually falling, in 2015 rape was harvested from 119, 302 ha. It means the decrease by 47, 174 ha (28 %) in comparison with 2009. The yields per hectare are fluctuating as a result of the different climatic conditions in the particular years. The lowest average yield per hectare was recorded in 2010 (1.97 t.ha^{-1}), the highest yield (3.57 t.ha^{-1}) was achieved in 2014. In that year the high yield per hectare was the essential factor of the highest production (448, 271 t). Import and export of rape are the indicators with the highest extent of variation (137, 205 t or 173, 916 t). Both indicators are decreasing, the balance of the international trade with the rapeseed achieved the positive value in all evaluated years. In 2015 out of the total rape production (320, 922 tonnes) 236, 171 tonnes (73.6 %) was used in Slovakia. In our country rape is mostly used

for the production of methyl ester of rape oil (MERO). In 2015 out of the total rape production 209, 655 t (65 %) was used for the production of MERA.

The producion-economic analysis of rape growing without subsidies is indicated in Table 2. There are the following indicators: yields per hectare, producers´ prices, costs incurred per hectare and tonne, achieved revenues per hectare and cost effectiveness. The highest producers´ price was monitored in 2012 (484.0 €.t^{-1}), and the lowest value in 2009 (241.2 €.t^{-1}). The costs incurred were increased by 30 %, by 12 % per tonne. The highest revenues per hectare were detected in 2014 (1, 195.9 €.t^{-1}) and the lowest ones in 2009 (559.6 €.t^{-1}). The revenues rose by 407.5 €.ha^{-1} (73 %) in the course of the whole evaluated period. The indicator of cost effectiveness points out at the fact that rape growing without subsidies was profitable only in 2011 and 2014.

Table 2 **Production-economic analysis of rape growing in SR in particular years (without subsidies)**

Evaluated years	Yield in t.ha^{-1}	Producers´ price in €.t^{-1}	Costs incurred in €.ha^{-1}	Costs incurred in €.t^{-1}	Revenues in €.ha^{-1}	Cost effectiveness
2009	2.32	241.2	885.2	381.6	559.6	0.63
2010	1.97	319.2	797.9	405.0	628.8	0.79
2011	2.31	460.6	954.3	413.1	1, 064.0	1.11
2012	1.99	484.0	1, 083.0	544.2	963.2	0.89
2013	2.74	369.8	1, 098.1	400.8	1, 013.3	0.92
2014	3.57	335.0	1, 151.0	322.4	1, 195.9	1.04
2015	2.69	359.5	1, 154.2	429.1	967.1	0.84
Index 11/05	1.16	1.49	1.30	1.12	1.73	-

Source: SO SR, Costs incurred and economic results of agricultural firms in SR in 2009- 2015 RIAFE Bratislava, own calculations.

Subsidies are one of the tools used by the EU and Slovak government in order to help farmers to survive under the negative conditions for the agricultural production and negative years. The Table 3 indicates the analysis of the subsidies effectivity in rape growing. If we compare the cost effectiveness in Table 2 and Table 3, we can see that the subsidies provided to our rape producers helped them to achieve the positive economic results in 2012, 2013 and 2015. In 2009 and 2010 rape growing was loss-making in Slovakia, the subsidies helped to our producers to decrease this loss to -102.6 €.ha^{-1}, or -26.7 €.ha^{-1}.

Table 3 **Analysis of subsidies effectiveness of rape in SR in particular years**

Evaluated years	Subsidies in €.t^{-1}	Subsidies in €.ha^{-1}	Revenues in €.ha^{-1}	Economic results without subsidies in €.ha^{-1}	Economic results with subsidies in €.ha^{-1}	Cost effectiveness
2009	96.1	223.0	782.6	-325.6	-102.6	0.88
2010	72.3	142.4	771.2	-169.1	-26.7	0.97
2011	67.3	155.4	1, 219.4	109.7	265.1	1.28
2012	146.0	290.5	1, 253.7	-119.8	170.7	1.16
2013	90.8	248.9	1, 262.2	-84.8	164.1	1.15
2014	86.4	308.4	1, 504.3	44.9	353.3	1.31
2015	70.9	190.6	1, 157.7	-187.1	3.5	1.00

Source: Costs incurred and economic results of agricultural firms in SR in 2009-2015 RIAFE RIAFE Bratislava, own calculations.

Table 4 **Break-even points of rape yield in SR in particular years**

Indicator		Evaluated years						
		2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Yield in t.ha^{-1}		2.32	1.97	2.31	1.99	2.74	3.57	2.69
Break even point in t.ha^{-1}	1	3.67	2.50	2.07	2.24	2.97	3.44	3.21
	2	2.62	2.04	1.81	1.72	2.38	2.73	2.68
Difference in t.ha^{-1}	1	-1.35	-0.53	0.24	-0.25	-0.23	0.13	-0.52
	2	-0.30	-0.07	0.50	0.27	0.36	0.84	0.01

Note: 1 – without subsidies, 2 – with subsidies.
Source: Costs incurred and economic results of agricultural firms in SR in 2009-2015 RIAFE Bratislava, own calculations.

In the Table 4 we evaluate the break-even points of yields in rape growing. The break-even point expresses the economic situation where all costs are refunded and neither profit nor loss is recorded. The higher quantity of production is produced above the the break-even point the higher profit is achieved in the evaluated year. At the same time the profit is less influenced by the risk factors, in particular by the change of the exercise price in trading. The higher quantity of production is produced below the break-even point the higher loss was recorded in rape production in the evaluated year.

In the evaluated period the biggest difference in the calculated break-even point of rape yield without subsidies was recorded in 2009 (-1,35 t.ha^{-1}), which means if the rape yield was increased by 1.35 t.ha^{-1}, thus the cultivation costs would equal revenues. If the subsidies were counted, the yield increase would achieve 0.30 t.ha^{-1}. It is evident that the year 2009 was the least favourable out of the evaluated period from the economic viewpoint. The most profitable years for rape growing were 2011 and 2014 when the level of break-even point without subsidies was lower than the real yields per hectare. In 2009 and 2010 the value of calculated break-even points with subsidies was higher than the yield. That means the rape growing with subsidies was also loss-making. In 2012, 2013 and 2014 the rape production was profitable with subsidies, however, it was loss-making without subsidies.

The Table 4 indicates the necessity to intensify the production, in particular, by taking over the positive experience and results from the best producers who are able to achieve the yields 3.0 t.ha^{-1} and more. The rentability of rape growing was influenced by the other essential factors: costs incurred, exercise price and subsidies – apart from the achieved yields per hectare.

4   Conclusion

Growing of oil crops has gained the considerable dimensions. Rape is the most significant crop in our conditions. It ranks among the profitable commodities of the agrarian market. The rape grown in Slovakia is used predominantly for MERA production and for export. In 2015 out of the total production (320, 922 t) 125,564 t was exported, which is 39.1 %. In our paper we evaluate the rape growing from the production-economic aspect in 2009-2015. The results indicate that the economic advantage of rape growing is influenced mostly by the climatic conditions, production intensification, exercise prices and subsidies. The year 2011 was the most profitable one out of the evaluated years. The highest loss in rape growing was recorded in 2009. We can claim that the period 2011-2015 in rape growing was advantageous from the economic viewpoint. Our producers can achieve higher yields per hectare by the production intensification.

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TRANSFORMATION OF POLISH SUGAR MARKET

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Abstract

Poland and its sugar market represents very specific phenomenon among countries producing beet sugar. Polish sugar industry, as one of the few in the former Eastern bloc, survived its own clinical death. Despite significant reduction in the number of sugar factories from 76 (2001) to only 18 (2017), Polish sugar industry kept considerable production capacity. Main aim of presented contribution is to identify main trends and important specifics connected to Polish sugar industry development between 2000 and 2017. Polish market underwent significant restructuring that on one side resulted in significant reduction of amount of sugar refineries and sugar beet producers. On the other hand, it resulted in considerable concentration of production capacities among subjects that successfully passed the transformation phase. Total amount of farmers producing sugar beet decreased from about 112 thousand in 2000 to just 34 thousand in 2017. Although this reduction seems to be very drastic, in reality, sugar sector was able to absorb successfully this change and finally the sector became much stronger. Between 2000 and 2017, total sugar beet production is almost unchanged at the level of 12 million tonnes. The decline in sugar beet harvested area was substituted by a significant increase in yields and by an increase in average sugar content. Also, sugar production remained almost unchanged and during the period oscillated around the level of 2 million tonnes. Only four players (Krajowa Spolka Cukrowa S.A., Nordzucker Polska S.A., Pfeifer&Langen, Südzucker Polska S.A.) control all production capacities. The market is highly oligopolistic. Results of the competitiveness analysis of sugar foreign trade concluded, that Polish sugar exports have a considerable potential. But extreme territorial concentration is seen as weak point.

Keywords: *Market, production, capacities, trade, transformation, process, Poland, Krajowa Spolka Cukrowa S.A., Nordzucker Polska S.A., Pfeifer&Langen, Südzucker Polska S.A, sugar*

JEL Classification: *Q02, Q13, Q17*

1   Introduction

Poland and its sugar market represents very specific phenomenon among countries producing beet sugar. Polish sugar industry, as one of the few in the former Eastern bloc, survived its own clinical death. Despite significant reduction in the number of sugar factories from 76 (2001) to only 18 (2017), Polish sugar industry kept considerable production capacity (Jagiełło, 2009). Current installed capacity of all sugar refineries can process approximately 114 thousand tonnes of sugar beet per one day. Refineries employ about 3,300 people. Annual sugar beet production reaches about 12.3 million tonnes and annual sugar production approaches 2.3 million tonnes. Polish sugar industry produces about 1.3% of world sugar production and 12% of EU sugar. Polish share on global production of sugar from sugar beet oscillates around 5.6%. Local production exceeds local consumption of sugar by almost 600 thousand tonnes annually. Surplus in production creates appreciable export potential. Annually about 500 thousand tonnes of sugar is being exported, it represents a considerable share particularly on the European market or in the perspective of global trade with beet sugar. Polish market underwent significant restructuring that on one side resulted in significant reduction of number of sugar refineries and sugar beet producers (Molas et al., 2017). On the other hand, it resulted in considerable concentration of production capacities among subjects that successfully passed the transformation phase (Artyszak, 2009). Observed concentration is a general characteristic of the whole EU sugar industry (Benešová et al., 2015; Řezbova et al., 2013). Although many improvements were implemented by Polish sugar industry, still there are problems to be solved – for example logistics (Polowczyk and Baum, 2016) or observed slowdown in investments (Szajner, 2016). In addition, it is important to mention, that during the transformation significant production capacities were acquired by foreign, predominantly German, capital. Foreign capital is represented by following companies: Südzucker; Nordzucker; Pfeifer&Langen. Position of the Polish state is also a specific feature of local sugar industry. The state still controls one of the largest sugar production corporations operating on Polish territory - Krajowa Spółka Cukrowa S.A..

2   Data and methodology

Main aim of presented contribution is to identify main trends and important specifics connected to Polish sugar industry development between 2000 and 2017.

Own analyses is based on comparison of secondary data sourced from Polish national sources (National Research Institute, Agricultural Market Agency, Ministry of Agriculture and Rural Development, Central Statistical Office of Poland), Eurostat and F.O.Licht database.

For the purpose of own analyses, the following categories of data are observed: sugar beet yields, harvested area and total production; sugar production and trade (H4-1701); number and specifics of farms linked to beet production; number and specifics of sugar refineries; sugar consumption and its structure; sugar prices. Also, selected economic and financial indicators of individual actors are specified.

Individual data are analysed in usual metric units; prices are expressed in euros in nominal expression. The development over time is analysed by using simple statistical indicators such as average, geometric mean and base index (2017/2000).

Attention is paid to the competitiveness of Polish sugar industry and its ability to gain comparative advantage (measured by LFI and TBI index).

The LFI (Lafay, 1992) index tries to identify whether a country has a "bilateral" comparative advantage. Using this index (LFI) we consider the difference between each item's normalized trade balance and the overall normalized trade balance. Using the LFI index we can focus on the bilateral trade relations between the countries and regions. For a given country(i,) and for any given product (j), the Lafay index is defined as:

$$LFI_j^i = 100 \; \frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^{N}(x_j^i - m_j^i)}{\sum_{j=1}^{N}x_j^i + m_j^i} \; \frac{x_j^i + m_j^i}{\sum_{l=1}^{N}x_j^i + m_j^i} \qquad (2)$$

where x_{ij} and m_{ij} are exports and imports of product j of country i, towards and from the particular region or the rest of the world, respectively, and N is the number of items. Positive values of the Lafay index indicate the existence of comparative advantages in each item; the larger the value the higher the degree of specialisation. (Zaghini, 2003)

Trade Balance Index (TBI) is employed to analyse whether a country has specialization in export (as net-exporter) or in import (as net-importer) for a specific group of products. TBI is simply formulated as follows:

$$TBI_{ij} = (x_{ij} - m_{ij}) / (x_{ij} + m_{ij}) \qquad (3)$$

where TBI_{ij} denotes trade balance index of country i for product j; x_{ij} and m_{ij} represent exports and imports of group of products j by country i, respectively (Lafay, 1992). A country is referred to as a "net-importer" in a specific group of products if the value of TBI is negative, and as a "net-exporter" if the value of TBI is positive (Widodo, 2009).

Finally, the concentration of production capacities (the participation of individual companies operating within Polish sugar market) and trade territorial structure (the participation of individual partner countries in Polish sugar exports) is analysed from the point of view of the most important Polish sugar industry players. This analysis is based on application of Herfindahl-Hirschmanov index (further referred as HHI) and "Four-firm concentration ratio" (further referred as CR_4). HHI is able to measure the market concentration of the industry; therefore, it is used by competition authorities to secure antitrust policy. HHI is characterized as the sum of the market shares of each trader in the sector and it is calculated as a sum of squared market share values of investigated entities in the industry:

$$HHI = \sum_{i=1}^{N} s_1^2 = s_1^2 + s_2^2 + s_3^2 + \dots + s_n^2 \qquad (4)$$

where s_i stands for market share of corporation "i" in the sugar production, N denotes total amount of corporations operating on the relevant market in the given country. According to Hirschman (1964), HHI ranges between 0 and 10 000, while 0 indicates no concentration and high competitiveness of the market and 10 000 indicates low level of competition and signalise monopoly. In this contribution classification of concentration is based on methodology used by U. S. Department of Justice and Federal Trade Commission. Their methodology indicates highly competitive environment for values below 100. Values below 1,500 indicates non-concentrated environment where operates number of important sugar companies. Values above 2,500 usually indicates market with monopolistic competition where exists significant concentration. The more HHI approaches 10,000, the more monopoly characteristics are evinced by the market.

The "Four-actors concentration ratio" (CR5) indicator is used to identify the main actors participating Polish sugar exports within the monitored group of countries. It assesses the share of the five largest countries participating in Polish s_i sugar trade. This indicator is calculated as (representing the share of every single actor/country in total Polish sugar exports).

$$CR_n = \sum_{i=1}^{n} s_i = s_1 + s_2 + s_3 + \dots + s_n \qquad (5)$$

For the CR_4 evaluation, interpretation of DG Compete was used (London Economics, 2007). The values between 0 and 50% indicate perfect competition directing towards oligopoly. The range from 50 to 80% is a clear oligopoly and the results above 80% express the direction of the oligopoly towards the monopoly.

3   Results and discussion

Polish sugar market was developing itself in a very specific way during last 17 years. Significant changes influenced not only sugar-producing entities, but also agricultural producers who supply a key input for sugar production in Poland – sugar beet. Between 2000 and 2017, the situation in the sugar beet production sector changed significantly. While in 2000 sugar beet was harvested from 318 ths. hectares, between 2015 and 2017 beet was harvested only from 202 ths. hectares. Although the area shrank by about 34%, total sugar beet production was not limited. Annual production oscillated around 10 and 12 million tonnes. Decrease of harvested area was by improving situation in yield (as also described by Řezbová et al., 2013); between 2000 and 2017 yield increased by 60% from 40 t/ha up to more than 60t/ha. Also, number of farmers changed. While in 2000 about 112 ths. farms were producing sugar beet, in 2017 only 34 ths. farms continued with sugar beet production.

There was observed increase in the average number of farms supplying one refinery. In 2000, about 1,500 sugar beet producers supplied one refinery, while in 2017 this value already exceeded 1,900 farms. Also, average harvested area per one farm increased. While in 2000 average farm harvested beet from 3ha, in 2017 average area approached 6.5 ha. Significance of this change was also confirmed by research conducted on the level of the EU (Eurostat, 2017) as it concluded that share of small scale farers (up to 5 hectares) on sugar beet production was reduced from 90 to 7.3%. As small farms produced almost 50% of total sugar beet in 2000, in 2013 their share was only 1.2%. At present, nearly 50% of beet growing areas are under the control of farms with a size exceeding 50 hectares, growing sugar beet on more than fifty hectares. As a result, significant restructuring of sugar beet production was observed, this resulted in a reduction in the number of growers and greater concentration of production capacities. Undoubtedly, this trend has also been accompanied by a significantly higher efficiency of beet production, which subsequently allowed a significant increase in yield. Over the period, sugar beet price oscillated between 25 and 40 EUR per tonne, however in terms of the long-term average, price ranged between 25 and 30 EUR/tonne.

Stable production of sugar beet logically resulted also in relatively stable production of sugar. Between 2000 and 2017, total sugar production oscillated close to 2 million tonnes of raw sugar equivalent. Sugar production was also significantly increased in relation to one harvested hectare. Original value of year 2000 (production of 6.56 tonnes of sugar per one hectare) almost doubled (to 11.2 tonnes per hectare).

Table 1 **Development of raw sugar production**

Sugar production (raw sugar equivalent)	Poland	
	thous. tonnes	tonnes per ha
2000/2001	2.013	6.56
2002/2003	2.193	7.24
2004/2005	2.176	7.45
2006/2007	1.873	7.94
2008/2009	1.411	8.02
2010/2011	1.556	7.33
2012/2013	2.025	9.82
2014/2015	2.156	11.20
2016/2017	2.283	11.20
Growth rate /GEOMEAN	1.008	1.034
BASIC INDEX 2017/2000	1.134	1.707

Source: Sugar market - the state and prospects. No. 20-44. Institute of Agricultural and Food Economics. Agricultural Market Agency. Ministry of Agriculture and Rural Development.

Number of companies operating on the market and the development of the number of sugar refineries are another specific feature of the Polish sugar industry. Between 2001 and 2017, the number of sugar refineries was reduced by more than 70%. Most of the sugar refineries was closed by Krajowa Spółka Cukrowa S.A (20 refineries); Śląska Spółka Cukrowa (16 refineries); Sűdzucker S.A. (12 refineries) and British Sugar Overseas - Poland (10 refineries). Śląska Spółka Cukrowa and British Sugar Overseas closed all their sugar production activities and since then they are not active on the market. Pfeiffer&Langen closed 7 and Nordzucker S.A. closed 6 sugar refineries. It is important to mention that the reduction in the number of sugar refineries has not been reflected significantly in sugar production. Despite the decreasing number of sugar refineries (-58), the volume of sugar production has not been significantly affected. Even the production loss caused by closure of two groups was completely compensated. Producers who remained on the market increased production. In particular, Südzucker S.A. increased sugar production capacity from 105 ths. to 523 ths. tonnes; Pfeiffer&Langen increased production from 273 ths. to 550 ths. tonnes. Also, campaign length was extended, and it resulted in improved efficiency. In average, Polish sugar campaign prolonged from 51 (2001) to 112 days (2016); Krajowa Spółka Cukrowa S.A increased the average number of campaign days from 51 to 102; Sűdzucker

S.A. from 40 to 127 days; Pfeiffer&Langen from 51 to 120 days and Nordzucker S.A. from 55 to 103 days.

Speaking about sugar-producing groups, it is worth mentioning, that mainly Sűdzucker and Pfeiffer&Langen required more sugar beet due to longer campaign increased production. Therefore, they increased their share on purchased beet measured by share on contracted beet production area. Their share rose from 8.3 to 22.4% and 15.6 to 26.3% respectively. In the case of other producers, their shares on the contracted production areas remained preserved. On the other hand, all companies evince significant reduction in the number of contracted farms. But this reduction was fully compensated by the fact, that an average contracted farm intensified its production. Installed daily capacity for sugar beet processing among individual refineries is another characteristic feature of polish sugar industry. Based on the available data it can be concluded, that Polish sugar refineries can be considered relatively large. Their daily beet processing capacity ranges from 3,500 and 12,200 tonnes, average capacity per one sugar refinery reaches about 6,351 tonnes per day. With only two exceptions, all refineries produce sugar from sugar beet; only refineries in Glinojeck and Chelmza have limited capacity (1,200 t/day and 800 t/day respectively) to process also imported raw sugar. During the transformation period, average annual sugar production capacity was increased significantly. Between 2001 and 2006, average production of each refinery increased from 20 ths. to 116 ths. tonnes per annum. An important indicator is also the increase of annual average sales per one sugar refinery. In 2016, average refinery evinced sales of about 70 million EUR. Total turnover of all polish refineries was about 1.153 billion EUR. Labour productivity development was also observed as in 2016 sugar production per one employee reached approximately 630 tonnes, and turnover was about 380 ths. EUR per person employed. Also, economic indicators of the whole sugar industry improved. Indicators changed as follow between 2000 and 2016: total revenues (+17%), net income (+198%), return on sales (from 6.7 to 17%), liquidity (from 1.1 to 4.0). Also a continuous transfer of investments was reflected in the Polish sugar industry, as cumulated investments reached a total of 4.115 billion PLN (1.016 billion EUR) between 2000 and 2016. Similarly to Szajner (2016), it can be concluded that investments are being slowed down. Investment peak is observed in 2006 (93.6 million EUR), since than investments have been falling to 49.4 million EUR in 2016.

Table 2 **Selected Economic Characteristics of Polish Sugar Industry**

Specification	2007	2009	2011	2013	2015	2016
Sales. in total (million EUR)	1,155	1,039	1,540	1,477	1,031	1,253
Sales. per 1 enterprise (million EUR)	40	58	86	82	57	70

Specification	2007	2009	2011	2013	2015	2016
Labour productivity (tonnes per emplyee)	263	342	531	518	444	630
Labour productivity (thous. EUR per employee)	157	221	440	434	312	380

Source: Sugar market - the state and prospects. No. 20-44. Institute of Agricultural and Food Economics. Agricultural Market Agency. Ministry of Agriculture and Rural Development.

Table 3 **Selected Economic Characteristics of Polish Sugar Industry**

Specification	2008	2010	2012	2014	2016
Net revenue. current prices (million EUR)	1,175.1	1,148.2	1,820.2	1,255.0	1,290.3
Net profit (million EUR)	-88.1	164.2	398.3	134.3	218.9
Return on sales (%)	-7.5	14.3	21.9	10.7	17.0
Current liquidity ratio	2.6	3.3	3.4	3.3	4.0
Investment. current prices (million EUR)	87.5	72.4	69.4	52.5	49.4

Source: Sugar market - the state and prospects. No. 20-44. Institute of Agricultural and Food Economics. Agricultural Market Agency. Ministry of Agriculture and Rural Development.

The economic performance of the sector was largely reflected in relatively stable sugar market. The average price, with some exceptions, fluctuated between 0.5 and 0.6 EUR/kg. Polish market was also stabilised by slowly increasing consumption as it rose from 1.6 to 1.72 million tonnes. Increase in consumption was not pushed by change in consumption among Polish households, but it was pushed by food industry. While consumption of households decreased from 780 to 550 ths. tonnes between 2000 and 2017 (-30%), consumption of food industry increased from 770 ths. to 1,1 million tonnes (+42%). Decreasing consumption of Polish households was fully compensated by the growing consumption of food industry, which increased consumption by more than 300,000 tons a year. Per capita sugar consumption remained relatively stable throughout the monitored period. It remained at a level exceeding 40 kg per year.

It is necessary to mention, considering sugar production and installed production capacities, that polish market evince relatively high concentration rate.

According to the HH index (2,944 points), Polish sugar market operates under monopolistic competition with significant concentration.

Polish sugar industry is strongly influenced by international trade. Between 2000 and 2017, the volume of sugar exports oscillated between 350 and 700 thousand tonnes. The peak (702 ths. tonnes) was reached in 2006, the minimum (335 ths. tonnes) was realized in 2011. In average, total annual exports amounted to 430 ths. tonnes and increased in average by 0.9% per annum. Polish exports can be characterized by relatively significant year-on-year fluctuations. Its standard deviation from the average was about 30%. On contrary to volumes, value of exports evinced annual growth of about 5.3% as the value increased from approx. 100 million to 240 million EUR. Lowest value of exports is observed in 2002 (51 million EUR), while maximum (377 mil. EUR) occurred in 2012. Also export values were highly volatile. This statement is supported by the standard deviation of mean that reached 45%. The value and volume of exports was influenced by the development of unit prices as they increased from 0.23 in 2002 to 0.48 EUR/Kg in 2017, instability of export price is supported by standard deviation of mean at the level of 33%. Value and volume of imports rose more dynamically compared to exports. Between 2000 and 2017, volume of imports increased from 55 to 210 ths. tonnes; value of imports rose from 16 to 90 million EUR. While value and volume of exports gained in average 5.3%, respectively 0.9% per annum, import values and volumes gained in average 8.2% and 10.8%. However, it must be noted, that import was even more unstable than exports; standard deviation from mean are 59% (for volumes) and 69% (for values). Although the growth rate of imports outperformed the of exports (with only exception of kilogram price: 4.3% per annum for export vs. 2.4% for import), Poland managed to maintain a positive trade balance in the analysed period, both in value and volume terms. At present (2016/2017), the surplus of the trade balance is estimated to be about 150 million EUR and 290 ths. tonnes of sugar.

A particular feature of the Polish sugar market is its trade orientation primarily to the EU countries. Poland export significant share of its production in the EU. However, the EU market has not always been a key sugar destination. In the pre-accession period, particularly in year 2000, Poland only exported 1.85% of its exported volumes (i.e. around 2.51% of exported value) to the EU. Subsequently, as the accession was approaching, share of Polish exports to the EU increased. In 2003, EU received about 24.98% and 26.09% of exported volume and value respectively. Entry into the EU was a turning point from the perspectives of Polish agrarian foreign trade. In 2004, as much as 48.56% and 73.53% of Polish export directed to the EU countries measured in volume and value. This situation was affected by change in export price, related to higher price of sugar in the EU. The

export price, after Poland became EU member and accessed the single market, grew from an average 0.21 to 0.57 EUR/kg between 2003 and 2004. Exports to the EU single market grew from 100 ths. tonnes (23 million EUR) in the period immediately before the accession to less than 300 ths. tonnes (150 million EUR) in 2016. The export maximum was reached in 2013, when the total volume of exports amounted to approximately 365 ths. tonnes (about 250 million EUR). The share of EU countries in sugar exports reached its peak in 2009, when about 88.52% (in volume terms) and 91.94% (in value terms) of exports directed to single market. After 2013, export to EU evinced further decrease. In 2016, 61.37 percent of trade volume finished in EU (66.37 of trade value). Above stated information indicates, that between 2004 and 2016 the exports to the EU underwent turbulent changes and fluctuations, as volume and kilogram export prices strongly oscillated. The average year-on-year change can serve as an evidence of this turbulent development, it achieved in value and volume terms 30.8 and 27.6 percent respectively. High fluctuation can be also indicated by a high percentage rate of standard deviation from the mean reaching 57.52% and 65.92% percent in volume and value respectively. Unit export price showed in average standard deviation from the mean of about 28.13 percent. Among relatively volatile exports, similar market behaviour can be observed in relation to imports. Import volumes and values evince relatively high average annual rate of change. Through the observed period, annual average rate of change reached in value and volume 9.4 and 12.3 percent respectively. Observed export growth rate outperformed import growth rate. On the other hand, import deviations were much more intensive than export annual deviations as it could be observed in the values of average standard deviation from mean of sugar import volumes (64.13%) and values (78.16%). Even growth rate of kilogram import prices (2.6% per annum) grew little bit faster than export prices (2.5% per annum). Import prices has higher standard deviation from the mean (37.70%), comparing to export price (28.13%). Generally, volumes of imports from EU countries fluctuated over time. At the beginning of the analysed period, the share of imports from the EU countries was very significant, both in the case of import volumes (about 45 ths. tonnes, share 82.7%) as well as in the case of import values (12.5 million EUR, share 79.6%). Prior to the EU accession (2003), imports amounted to 74 ths. tonnes, respectively it amounted to less than 20 million EUR and the share of imports from EU countries accounted for 96.86% and 98.93% respectively. In the period after the accession, share of EU countries on Polish sugar imports was gradually reduced. A minimum was reached in 2012, when EU accounted only for 18.13% of imported volume and 23.58% of imported value. Imports from the EU reached its maximum in terms of volumes in 2009 (223 ths. tonnes) and in terms of value in 2011

(137 million EUR). EU sugar market regulations supported import fluctuations, as they significantly affected Polish production capacities as well as capacities in other countries. In addition, the Common Commercial Policy and Common Agriculture Policy influenced performance of agrarian foreign trade, as both policies isolated the EU internal sugar market from the rest of the world. The sugar price and supplied quantity were not determined by demand, but their development was largely determined by subsidies, production and import regulations. Present Polish sugar market is characterised by positive trade balance expressed both in trade volume and value. Negative trade balance was only observed prior to Polish EU accession and in year 2009. Internationalization of its production capacities was very important aspect that has significantly influenced the character of Polish foreign trade. Majority of production is no longer under the control of primarily Polish capital, but they are under the control of international capital. A significant part of Polish production and export capacities are controlled mainly by German companies such as Nordzucker, Südzucker and Pfeifer&Langen. Polish sugar industry was significantly affected by applied sugar production quotas. For a long time, they limited production at the level of 1.4 million tonnes of sugar a year. On one hand, quotas greatly reduced the export ambitions of Polish sugar industry; however, on the other hand quota system generally protected the Polish market from competition from other EU countries.

The territorial structure of the Polish sugar trade is very concentrated. The top five export destinations (Germany, Israel, Lithuania, Italy and Latvia) accounted for approximately 52.6 percent of Polish sugar exports in value. Russian Federation, Czechia, Georgia, Greece and Hungary belong together with above mentioned countries, to the TOP10 export partners. The share of TOP10 trading partners in total sugar exports reached approximately 72.56% in 2016. An even higher degree of concentration is observed by the territorial structure of Polish imports. TOP5 (Sudan, Zimbabwe, Mozambique, Germany, Lithuania) and TOP10 (TOP5 Sweden, Mauritius, Czechia, Denmark, Ukraine) import destinations accounted for 71.4 and 92.94 percent of sugar imports to Poland. The HH Index analysis shows the high level of concentration of the territorial structure of the sugar foreign trade, both from the export and import perspective. The HHI value for the export reaches 965 points and the HHI value of imports reaches about 1228 points. Also, CR4 confirms high level of territorial concentration. CR4 ration calculated for four main export destinations (Germany, Lithuania, Israel, Latvia and Italy) reached the value 52% - it means the character of export structure is close to oligopoly.

Table 4 **Comparative advantages of Polish sugar exports toward EU countries**

Country (2016)	LFI	Country	TBI
Austria	-0.123	Austria	-0.48
Belgium	0.487	Belgium	0.913
Bulgaria	0.18	Bulgaria	1
Croatia	0.001	Croatia	1
Cyprus	0.169	Cyprus	1
Czechia	-0.085	Czechia	0.388
Denmark	0.027	Denmark	-0.149
Estonia	0.175	Estonia	0.987
Finland	0.007	Finland	1
France	-0.083	France	-0.438
Germany	0.343	Germany	0.634
Greece	2.12	Greece	0.997
Hungary	0.793	Hungary	0.992
Ireland	0.054	Ireland	0.993
Italy	0.449	Italy	0.98
Latvia	1.456	Latvia	1
Lithuania	-0.415	Lithuania	0.247
Luxembourg	0.703	Luxembourg	1
Malta	0	Malta	1
Netherlands	0.039	Netherlands	0.326
Portugal	0	Portugal	1
Romania	0.055	Romania	1
Slovakia	0.145	Slovakia	0.794
Slovenia	-0.005	Slovenia	-0.515
Spain	0.026	Spain	0.98
Sweden	-1.374	Sweden	-0.516
United Kingdom	-0.023	United Kingdom	0.242

Source: UN Comtrade, own processing, 2017.

Table 5 **Comparative advantages of Polish sugar exports toward non-EU countries**

Country (2016)	LFI	Country	TBI
Algeria	0.002	Algeria	1
Argentina	0	Argentina	-0.998
Armenia	0	Armenia	1
Australia	0.007	Australia	1
Azerbaijan	0.003	Azerbaijan	1
Bahrain	0.002	Bahrain	1
Barbados	-0.02	Barbados	-1
Belarus	-0.031	Belarus	-0.169
Belize	-11.836	Belize	-1
Bosnia Herzegovina	-0.252	Bosnia Herzegovina	-1
Brazil	-0.039	Brazil	-1
Bunkers	0	Bunkers	1
Cambodia	-0.817	Cambodia	-1
Cameroon	8.41	Cameroon	1
Canada	0.015	Canada	1
Colombia	-0.151	Colombia	-1
Cook Isds	0	Cook Isds	1
Cuba	-0.027	Cuba	-1
Egypt	0.48	Egypt	1
Georgia	9.382	Georgia	1
Ghana	0.234	Ghana	1
China	0.074	China	0.984
Iceland	0.012	Iceland	1
India	0.002	India	1
Indonesia	-0.036	Indonesia	-1
Israel	2.961	Israel	1
Jordan	0	Jordan	1
Kazakhstan	5.228	Kazakhstan	1
Kuwait	0	Kuwait	1
Kyrgyzstan	0.062	Kyrgyzstan	1
Lebanon	5.845	Lebanon	1

Country (2016)	LFI	Country	TBI
Libya	0	Libya	1
Malawi	-0.011	Malawi	-1
Malaysia	0.002	Malaysia	1
Mauritius	-20.721	Mauritius	-1
Mongolia	0.05	Mongolia	1
Mozambique	-11.495	Mozambique	-1
Myanmar	9.452	Myanmar	1
Norway	0	Norway	1
Oman	0.005	Oman	1
Pakistan	0.001	Pakistan	1
Paraguay	0	Paraguay	-1
Qatar	0.026	Qatar	1
Rep. of Korea	0.033	Rep. of Korea	1
Rep. of Moldova	5.298	Rep. of Moldova	0.895
Russian Federation	0.982	Russian Federation	1
Saudi Arabia	0.001	Saudi Arabia	1
Senegal	0	Senegal	1
Singapore	1.558	Singapore	1
South Africa	0.474	South Africa	1
Sri Lanka	29.112	Sri Lanka	1
Sudan	-7.441	Sudan	-0.672
Swaziland	-0.002	Swaziland	-1
Sweden	-1.374	Sweden	-0.516
Switzerland	-0.006	Switzerland	-0.809
Syria	4.065	Syria	1
Thailand	0	Thailand	-1
Turkey	0.347	Turkey	1
Turkmenistan	0	Turkmenistan	1
Ukraine	-0.188	Ukraine	-0.987
United Arab Emirates	0.046	United Arab Emirates	0.925
USA	-0.001	USA	0.118
World	0.157	World	0.369

Source: UN Comtrade, own processing, 2017.

Existing comparative advantage in relation to partner countries is another specific feature of Polish sugar industry. Based on the results of the LFI analyses, it is possible to prove that Poland achieved bilateral comparative advantage of its exports with about 50 countries (more than 90 countries are involved into Polish sugar trade activities). Poland also achieved positive trade balance to most of its trade partners. From the perspective of comparative advantages, it is crucial that Poland achieved comparative advantages over most of the EU member states (18 EU countries: Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, Finland, Germany, Greece, Hungary, Latvia, Luxembourg, the Netherlands, Romania, Slovakia, Spain). Poland also reached positive trade balance in relation to 22 EU member countries (Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Romania, Slovakia, Spain, United Kingdom). As far as third countries are concerned, Poland exhibit bilateral comparative advantage toward 32 non-EU countries (Azerbaijan, Bahrain, Cameroon, Canada, Egypt, Georgia, Ghana, China, Iceland, India, Israel, Kazakhstan, Kyrgyzstan, Lebanon, Malaysia, Mongolia, Myanmar, Saudi Arabia, Singapore, South Africa, Sri Lanka, Syria, Turkey, United Arab Emirates).

4 Conclusion

The analysis shows the following findings in relation to Polish sugar production and sugar markets. Polish market underwent significant restructuring that on one side resulted in significant reduction of amount of sugar refineries and sugar beet producers. On the other hand, it resulted in considerable concentration of production capacities among subjects that successfully passed the transformation phase. Total amount of farmers producing sugar beet decreased from about 112 thousand in 2000 to just 34 thousand in 2017. At the same time, the number of sugar refineries decreased from 76 to 18. Although this reduction seems to be very drastic, in reality, sugar sector was able to absorb successfully this change and finally the sector became much stronger. Between 2000 and 2017, total sugar beet production is almost unchanged at the level of 12 million tonnes. The decline in sugar beet harvested area was substituted by a significant increase in yields and by an increase in average sugar content. Also, raw sugar production remained almost unchanged and during the period oscillated around the level of 2 million tonnes. On contrary, production of white sugar increased significantly from 1.54 in 2001 to almost 2.1 million tonnes in 2016. Reduction of sugar refineries was in this perspective compensated by the modernisation of those production facilities that were able to survive. Investments totalled about 1billion EUR. At the same time,

refineries increased their processing capacities. Between 2001 and 2016 length of sugar campaign increased from average 51 days to about 112 days. The average processing capacity of one sugar refinery grew by tens of percent and reached 6,351 tonnes a day (installed processing capacity of the smallest refinery is 3,500 and the capacity of the biggest refinery is 12,200 tonnes per day). The general stability of the Polish market has one forfeit – extreme concentration. Only four players (Krajowa Spolka Cukrowa S.A., Nordzucker Polska S.A., Pfeifer&Langen, Südzucker Polska S.A.) control all production capacities. The market is highly oligopolistic, dominated by three subjects: state-owned Krajowa Spolka Cukrowa, Südzucker and Pfeifer&Langen (both owned by German capital). Polish market is highly dominated by German influence, since companies controlled by German capital control approximately 56 percent of installed production capacities and produce more than 60 percent of white sugar.

The transformation process of Polish sugar industry did not significantly dam-aged sugar exports. Although volume of export significantly fluctuated, from the long-term perspective it oscillates around 0.5 million tonnes annually. Increasing unit price per kilogram of exported sugar is considered as a positive and impor-tant factor that pushed total value of exports to approximately 240 million EUR in 2017. Opposite to exports, volume of imports rose dynamically from 55 ths. tonnes in 2000 to more than 200 ths. tonnes in 2017. The total value of imports grew much slower than value of exports. Imports oscillates around 100 million EUR and makes sugar trade balance positive in the long-run. Polish sugar export is strongly oriented toward EU countries, while significant portion of imports originate in non-EU countries, in particular in countries with preferential access to EU markets under General System of Preferences. It is also important to men-tion that Poland has a considerable export potential and its exports are very com-petitive especially in comparison to other EU countries. However, more dynamic production development was disabled by system of production quotas (valid until 10/2017) that limited production of Polish sugar at the level of 1.4 million tonnes a year.

Results of the competitiveness analysis of sugar foreign trade concluded, that Polish sugar exports have a considerable potential. But extreme territorial con-centration is seen as weak point. Top 10 countries participate on Polish exports and imports with sugar approximately by 72.56% and 92.94% respectively (2016). The main partners of Polish exports are Germany, Israel, Lithuania, Italy and Latvia, while main importers are Sudan, Zimbabwe, Mozambique, Germany and Lithuania. At present, significant restructuring in the Polish sugar industry can be observed because of changes in EU's sugar policy (abolition of sugar quotas). General changes in EU legislative environment raise a question, whether Poland

will further strengthen its position on the European sugar market or whether the sugar market will suffer as a result of the restructuring of the sugar market, which is expected to be run by multinational actors in the European sugar market.

Acknowledgement

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INVESTIGATION OF THE WORK ACCIDENTS IN THE AGRICULTURAL SECTOR IN BULGARIA

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Abstract

The work accidents in the agricultural sector in Bulgaria is the paper's objective. Agriculture in is faced with increasing challenges and problems. Some of them we cannot control: world economy, climate change, weather extremes, abandonment of rural areas. What we can control is our capacity to work and our ability to overcome the health and safety problems with which we are faced.In this paper the OSH approach and performance in Bulgaria is discussed in the context of the wider EU approach to OSH and Agriculture and Rural Development policy. The demographics identified in agriculture in Bulgaria and across the EU, with an aging and generally untrained labour force, places distinct challenges to improving OSH within the sector and to the achievement of the EU 2020 Strategy and "Food Harvest 2014/2020" in Bulgaria

1   Introduction

While the 2007-2012 strategy was generally well received by the parliament and by member states, with many reflecting its contents in their own national strategies, the question must be asked if sufficient emphasis was or is placed on the high risk sectors of the community such as agriculture, forestry, fishing often populated by self-employed individuals on which EU Directives have little or no impact. OSH in Agriculture is not covered by a specific EU Directive and while various EU Directives do address certain health and safety issues self-employed workers are not well covered.

Agriculture forms the 11% -13% of Bulgaria's GDP and has become an important sector of the Bulgarian economy. After the financial crisis of 1996, agriculture was the only sector reported growth (30% in 1997 compared with 1996). This improvement has partly recovered the decline in agricultural production observed between 1989 and 1996, which is estimated at 30%. Agriculture is an important source of employment in Bulgaria, 23% of the active population works in the agricultural sector. Different causes for a decline in agricultural production for the period after the transition period. After the liberalization of prices, farmers are affected by a large increase in producer prices by reducing demand, as well as government intervention aimed at slowing down the increase in consumer prices of staple foods and to ensure food security by limiting exports. Failure to coordinate the process of returning the land to its former owners with the liquidation of state-controlled co-operatives increased the difficulties of transition. The combination of this pressure with the difficulties resulting from land reform gives an explanation for the decline in agricultural production. In addition, the wrong policy conducted during 1995 and 1996 and poor weather conditions led to a shortage of grain in those years with very negative consequences for the agricultural sector and food industry. The decline in production was accompanied by a decline in domestic demand and changes in consumption patterns, mainly from animal products to cereals, due to the overall loss of purchasing power and the high share of food expenditure of total income of the population. In 1997, the agricultural recovery was due mainly to favorable yields and grain harvest this year.

The new legislative framework aims at improving the working conditions, provision of welfare at work and quality of work, taking into account changes in the workplace and the emergence of new occupational hazards. Purpose of the National Strategy is to reduce accidents by 25% by 2013, it is expected that the implementation of the National Program for 2009 will lead to a 8% decrease in the number of accidents. Achieving this goal is of particular importance given that, although declining in recent years, the number of accidents is still high. An important factor for improving the working conditions of social partnership and expansion of participation in the workplace in the agrarian sector. The best legislation is not sufficient to establish a good working conditions, it is only a necessary and important first step. The challenge and the government and the employers and trade unions, is its effective enforcement and compliance. An additional challenge is that many of the established social partnership bodies do not function effectively. This also applies largely to the WCC and WCG in the construction and operation of which there are significant problems.

1.1   Characteristics of the accident

Occupational accident is any sudden injury to health occurred during and in relation to or in connection with work performed as well as any work performed in

the interest of the undertaking when the cause disability or death. Labour is accident occurred during the usual time for going to and returning from the workplace to the principal place of residence; where the insured worker usually eats during the working day; place to receive remuneration. For each occupational accident victim, his immediate supervisor or witnesses of the accident immediately inform the head of the employer / enterprise user or the authorized official. The majority of the participating members of the WCC study - 67 percent - work in large companies, and third - in the middle.

Table 1 **Fatal accidents in Agriculture and Forestry sectors in the last Five Years:**

Years	Fatal accidents in Agriculture
2013	21
2014	11
2015	25
2016	22
2017	21

Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046.

1.2. The top eight killers in agriculture:

- Transportation accidents (being run over or overturning of vehicles)
- Falls from height (from trees, through roofs)
- Being struck by falling or moving objects (machinery, buildings, bales, tree trunks)
- Drowning (in water reservoirs, slurry tanks, grain silos)
- Handling livestock (attacked or crushed by animals, zoonotic diseases)
- Contact with machinery (unguarded moving parts)
- Entrapments (under collapsed structures)
- Electricity (electrocutions)

Figure 1 **Causes of Farm Deaths in the 10 year period (2007-2017)**
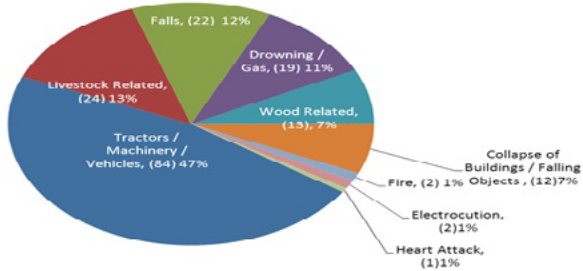
Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

As can be seen in Fig 3, almost half of all fatal accidents have involved tractors or machinery (47%). The next most hazardous activities causing death are working with livestock (13%), falls from Height (12%), drowning while working close to slurry or water (11%) and working with timber on the farm (7%).

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2   Data and Methods

Within the project "Social Competence for Safety in Agriculture" were held several meetings. Participation in them have taken almost 600 people. The questionnaire consists of three parts. Part A refers to the age and education of the persons interviewed. The aim of this part was to determine the profile of the target group. Part B consists of closed questions directly related to safety agriculture.

3 Results and Discussion

3.1. Analysis of the results of a survey conducted within the project "Social Competence for Safety in Agriculture"

3.1.1. Part A.

A total of 600 people completed the questionnaire. Of these, 383 were men and 217 - women. The average age of interviewees was 18-30. 253 respondents with secondary education. The majority of the participants live in rural areas, most inhabited farms than 1 hectare (201 people) and from 2 to 10 hectares (163 people). The main agricultural activity on farms is crop. Skilled workers and immigrants are part of the risk groups. One important group of agricultural workers are low-skilled. In recent years a large number of immigrants working in the agricultural sector as a result of which a problem with the perception of labor habits. Some of these habits relate to the prevention of occupational risks. Moreover - the ten-year period covering the years 1995-2005, the agricultural sector recorded the highest risk of fatal accidents, and remains one of the sectors with the highest number of non-working days.

3.1.2 Part B

The low level of awareness among farmers about the risks in the workplace due to the fact that farmers in their capacity as self-employed persons are not subject to the provisions of the Labour Code. No doubt this is one of the most important reasons for the high percentage of accidents on farms and occupational diseases as a result of agricultural labor. Due to insufficient safety on the farm, set by the European Federation of Trade Unions in the agriculture sector in their proclamation of better health and safety of agricultural workers need to make the necessary legislative changes to provide farmers rights and obligations similar to those of other workers outside the agricultural sector.

Figure 2 **Do you know the requirements for health and safety working conditions in agriculture**
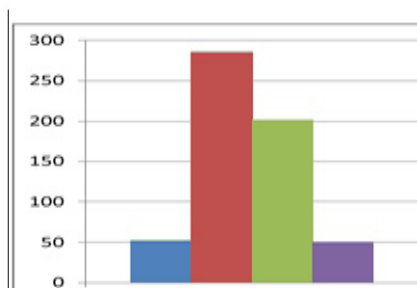
Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

Table 2 **The requirements for health and safety working conditions in agriculture**

The requirements for health and safety in agriculture	Answers
Largely	52
In moderate	285
In lesser extent	201
I have no knowledge of the topic	50

Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

Most respondents said that determine their knowledge of health and safety on the farm by more than medium high - 48% of respondents. Defined as weak knowledge, 33% of respondents.

Figure 3 **Do you undergone training in safety and health conditions in the farm**
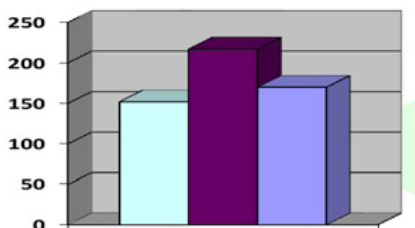
Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

Table 3 **Training in safety and health conditions in the farm**

Training in safety and health conditions in the farm	Answers
Yes	152
No, I do not intend to do it	217
I do not intend to do	170

Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

Figure 3 shows the state of learning. According to her, 25% of respondents have received training in health and safety on the farm. 36% were not trained but willing it to happen. 28% unwilling to undergo similar training for various reasons. Data show that the training should be aimed not only at people declaring their

wish to participate in this, but also to those who are not interested in this kind of training, but could change their minds.

Figure 4 **Are you aware of the risks associated with work on the farm**
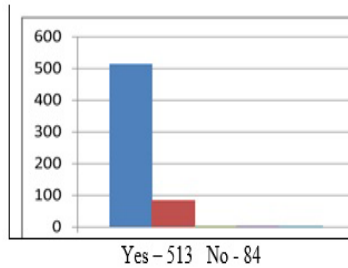
Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

3.1   Risk description

The identification of risk is based on a careful look at the factors at work that could be hazardous to health. The aim is to assess whether they are adequate preventive measures taken and whether they could be taken additional ones in order to avoid accidents and occupational diseases. Almost 82% of respondents say they know how to recognize the risks associated with work on the farm. To describe the risk must be taken into account all the risks associated with the specific type of work. It should be an evaluation of the outdoors and indoors. Risk assessment is subjective and therefore one should not trust her blindly.

Figure 5 **Have you witnessed the accident on the farm**
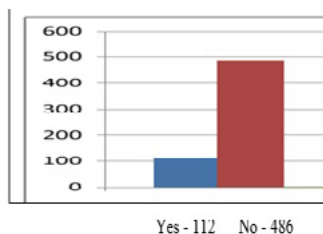
Source: SOCIAL COMPETENCE development at work in the AGRIculture sector.

Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

3.2 Causes of injuries

Most accidents occur due to improper organization of work, mainly as it relates to the improper organization of the workplace, such as poor conditions of transport; incoherence farm and production facilities; lack of adequate access and inappropriate distribution and storage of working materials; incorrectly entering and exiting the farm equipment; non-use of ladders and platforms at work high and improper use of tools. Only 64 respondents indicated as the cause of accidents fall from heights. A large number of accidents are caused by unsecured safety, improper placement of limbs in hazardous areas, poor coordination of collective actions and ignoring instructions work safety. Incidents arise as a result of incorrect rate of work or hurry in the work, and a sudden change in weather conditions.

Figure 6 **Have we're involved in an accident?** Figure7 **Do you know how to prevent accidents?**
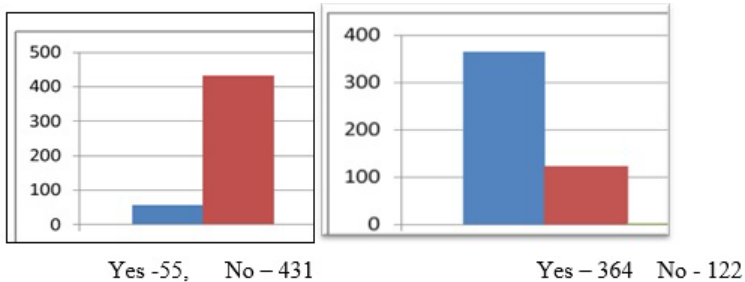
Yes -55,   No – 431   Yes – 364   No - 122

Source: SOCIAL COMPETENCE development at work in the AGRIculture sector. Health at SAFETY at work -2011-1-ES1-LEO05-36046, PROJECT 2008/108471 //"Health, safety and environmental working conditions," Bulgaria // www.hse-bg.org.

The main reasons for accidents caused by improper cover machinery, inadequate equipment and tools or their absence, failure to provide safe working conditions for farmers and failure to provide clothing, and inadequate protection of machinery when in motion or stationary. In smaller farms where the financial situation is difficult, the main cause of accidents is the old equipment, which should

be discarded and which has no protection on. 486 people have indicated this as a major cause of accidents.

The main cause of accidents related to animals, improper treatment, animal aggression and their reaction to the unfamiliar environment. Among the causes of incidents indicating the use of unsafe buildings for storage of production. Risks resulting from contact with animals are out of 60 respondents.

3.3 How to prevent accidents - prevention.

74% of respondents said that it is possible accidents on farms can be prevented, while 20.3% are of the opposite opinion. These responses can be attributed to the activities of various institutions working in the field of health and safety at work, providing not only training but also organize training events to improve the general awareness of the dangers in agriculture - competitions, quizzes, exhibitions, demonstrations, conferences, meetings and more. However, it is clear that large awareness campaigns are not sufficiently visible - respondents say they have not witnessed large-scale campaigns at national or international level. People are reached more easily through actions directly addressed to a specific audience. Specialized training and informal forms of dissemination of information are better means of large-scale television, radio and marketing campaigns.

Figure 8 **Do you know how to do first aid**
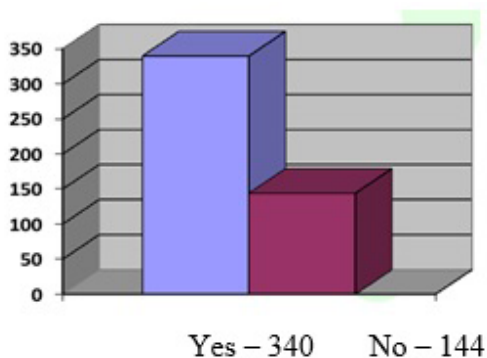
Source: Stoyanova, N / Influence Of The Social Policy European Union Planning Staff In The Less Country Members // Technical University Belovo Kemerovo region, Russia / / International Scientific and Technical Conference on innovative teaching methods in science and practice / / March 17 to 27, 2014.

Daily incidents kill many people, while others are injured. In cases where it is necessary to give first aid of great importance is the behavior of the witnesses. Alarmingly, very few people are able to provide first aid. Despite these data, 69% of respondents stated that they may have first aid while others said they could not help the victims of accidents on the farm. We need to know that it is possible at one point one of us needs this kind of help, but no one to prove. Still actions Witness accidents limited to call in an ambulance. These actions are also perceived as support and perhaps for that reason the majority of respondents said they know how to provide first aid. Lack of skills prevents appropriate action. Usually the problem is due to the fear of not harm a person. This situation is worrying, and this determines the importance of first aid training. When the witnesses passed training accidents can take lifesaving action. Many respondents stated that a one-day training on the subject will have the desired effect.

Table 4 **Which are the most common accidents?**

common accidents	Answers	Reasons
Accidents caused by animals	60	Accidents in this group occur mainly during the execution of daily activities such as feeding, milking, cleaning or during the loading of the animals when used for transportation. The reasons for most injuries associated with improper care of animals; poor conditions in which animals are kept; lack of fences; aggressive behavior of some animals; animal responses to unfamiliar surroundings or actions. Accidents with animals occur mostly in small farms, which have outdated equipment and facilities.
Accidents caused by machines	486	This type of accidents occur mostly when using machines and equipment for woodworking, during use of machinery designed to work in the fields and livestock, as well as during the use of hand-held power tools (drills, angle grinders and hand saws). Cause of accidents is the use of outdated equipment and misbehavior farmers neglect of safety rules, wearing loose clothing that can be attached when operating the machine and others. Farmers still use handmade saws that are unsafe

common accidents	Answers	Reasons
Accidents caused by work on high	64	Much of the fall in the farms are primarily the result of lack of proper care for the condition of the surface of the courtyards and pathways. After rain and melting snow and unpaved trails yards are slippery and muddy. Falls from height are due to inattention and relocated because of unnecessary items. Farmers could fall and during boarding and disembarking from the stairs of trailers loaded with straw and hay. The reason for these accidents is mainly unsecured cargo and non-use of ladders and platforms for loading and unloading.
Others	12	In this group are referred to responses that can be placed in any of the groups above. These include electric shocks, the escape of material during repairs and others. The reasons for these occurrences are poor maintenance of paths, non-use of protective clothing, misuse of equipment, trailers, vehicles, ignorance of the rules for safe use of electrical appliances and wearing the clothing.

4   Conclusion

The agricultural sector is one of the main sectors of the economy. It boasts a large number of self-employed persons and limited interference of state institutions that ensure the provision of healthy and safe working conditions. However, taking into account the commitment to public health and the desire to improve living conditions and working conditions of people working in private farms are carried out numerous educational, preventive and preventive initiatives. The majority are institutional measures required by legislation and regulations. Important role in play and institutions whose activities are aimed at protecting public health and the improvement of the technical security measures in agricultural activity. The main institutions mentioned by respondents are: the Agricultural Social Insurance Fund, the State Labour Inspectorate, the Institute of Rural Medicine, Central Institute for Labour Protection, some universities, the International Labor Organization and others. Only 15% know the educational institutions in their area. Almost 85% do not know what are the institutions that provide training for health and safety.

Improper inclusion of children work on farms, giving them work that is not consistent with their abilities, or their work in harmful or hazardous environments have adverse effects on health and overall development of children. The working environment of farmers has many risks to life and health of workers.

These risk factors have a much greater impact on children than on adults. Negative effects resulting from agricultural activity in family farms can affect not just on children directly involved in agricultural work, but also on those who are in the area to play or relax. It is therefore important that both parents and children aware of the dangers to life and health in agricultural work, and parents should have the necessary skills to organize safety at work on the farm and to ensure the safety of children at work, play or rest in farm.

Activities undertaken in this area by different institutions. The above institutions have developed educational and training materials for the prevention of threats to the lives and health of children posed by the life, work, rest and play in the farms. Moreover - have organized activities for children and their parents in the form of training, education programs and competitions to identify risks and ensure safe living conditions for children from farming families. However, only 18% of respondents are aware of these activities. Most respondents do not know whether schools are performing similar activities and trainings. Almost 80% said that such actions are not available or do not know about them. The conclusion that follows from these data is that the measures have not led to satisfactory results due to the lack of coordination of the initiatives of the various institutions that relate to children's safety on farms. Comparing the level of knowledge and awareness of the most common accidents, we can say that there is a stereotype among farmers and people working in agriculture that most accidents happen at work machines. This is true if we consider the amount of fatal accidents. However, according to results of a study conducted by the Agricultural Social Insurance Fund, most accidents happen at work high. It is therefore necessary to raise awareness about the fact that not only work with machines and carries risks that different types of agricultural work include various hazards. The study showed that it is important to pay attention to safety when operating machinery, but also at work on high. It is important to take into account and first aid. This need stems from the results of the polls. During the study identified was the ultimate target group of the project. The results confirmed the initial assumptions. The target group will comprise farmers engaged in agriculture and self-employed. Could include an additional target group - students in agricultural universities.

Acknowledgements

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SELF-SUFFICIENCY AS AN INDICATOR OF UKRAINE'S FOOD SECURITY

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Abstract

Food self-sufficiency involves satisfying the bulk of food intake at the expense of domestic production. which is the basis for the characteristic self-sufficiency index at the macro level. At the micro level, it is characterized by the degree of satisfaction of members of the household due to the receipt of major types of food from the management of personal peasant farms.

It is proved that the mechanisms of targeted food support in Ukraine are practically not used. The provision of domestic food aid through the sphere of social nutrition in Ukraine is carried out in all subjects, but its level is extremely insufficient. It is established that in the conditions of economic instability, personal peasant farms will be forced to remain at leading positions in food security and will be one of the main sources of cash inflows to the family budget.

Keywords: *food safety, rational norms, self-sufficiency, indicator of economic accessibility, export.*

JEL Classification: *Q 18, D 60*

1 Introduction

Each state must provide the population based on its own production of basic food products. Self-sufficiency in food involves satisfying the bulk of food needs at the expense of domestic production, which determines the independence of the state from external suppliers in meeting the needs of the population, which is the basis for characterization of self-sufficiency at the macro level. At the micro level, it is characterized by the degree of satisfaction of members of the household due

to the receipt of major types of food from the management of personal peasant farms. The level of self-sufficiency on the macro level is characterized by the state of development of agricultural production, at the same time as at the micro level - the size and sources of household income, the share of food costs, the location of the household and other factors of socio-economic nature.

2   Data and Methods

In the current conditions, when all the signs of the financial crisis are manifested, there is a decline in the population's solvent demand for food. In such a situation, the level of self-sufficiency in food is determined not by the full satisfaction of the reduced solvent demand of the population for food, but only by the level of satisfaction in it of the regulatory needs of consumption of basic foodstuffs.

3   Results and Discussion

Indicators of production and consumption of basic products, the degree of self-sufficiency of the main types of products, which reflect the food safety thresholds and correspond to the characteristics of food safety indicators, are important to characterize the country's potential capabilities in meeting its own food needs. The level of self-sufficiency of the country food is defined as the percentage of gross production of a particular product to its consumption [1].

At the same time, for all types of products (except for grain) the physiological norms of food consumption are used for the norm, and for grain - 1 t grain per one inhabitant of the country, because the grain is used not only for food production, but also for feeding animals and for export supplies.

Over the period under study, a significant excess of actual production over consumption has been observed, which suggests that, in the current difficult economic conditions, when a rapid decline in the purchasing power of the population, the domestic producer satisfies the needs of the domestic market (Table 1). However, according to the main types of livestock production, the level of production did not reach the threshold (80% of the rationale). If we analyze the level of self-sufficiency on the basis of rational consumption norms for meat products, then it is close to the threshold value solely by increasing the volume of poultry meat production.

In 2016, all categories of farms produced, in slaughter mass, meat of all kinds 2323.6 thousand tons, which is 1 thousand tons more than in 2015. At the same time, meat of beef and veal 375.6 thousand tons. t, which is 8.4 thousand tons less (2.2%) of the 2015 figure. A similar phenomenon is observed in the production of

pork, which produces in slaughter mass, pork meat 747.6 thousand tons, which is 12,1 thousand tons less (1,6%).

However, in 2016, farms of all categories produced in the slaughter mass, poultry meat 1166.8 thousand tons, which is 23.1 thousand tons more (2%) than in 2015. The growth of poultry meat production was offset by a decrease pork and beef production.

The consumption of meat and meat products per person per year in 2016 amounted to 51.4 kg, which is lower than the rationale (80 kg) by 28.6 kg. At the same time, compared to 2000, consumption increased by 18.6 kg.

The level of consumption of meat per one person has a positive trend and in 2016 it increased by 0,5 kg, or 1%.

Table 1 **Dynamics of production, consumption and index of self-sufficiency of basic food products in Ukraine**

Indexes	2000	2005	2010	2015	2016
Meat and meat products (in terms of meat)					
Actual consumption fund, thsd.	1611	1844	2384	2179	2195
Fund of consumption on the basis of rational norms, ths.	3929	3773	3668	3425	3416
Production, ths. Tons	1663	1597	2059	2323	2324
The level of security is based on					
• actual rates,%	103,2	86,6	86,4	106,6	105,9
• rational standards,%	42,3	42,3	56,1	63,7	68,0
Milk and dairy products (in terms of milk)					
Actual consumption fund, thsd.	9789	10625	9470	8995	8942
Fund of consumption on the basis of rational norms, ths.	18683	17897	17435	16284	16219
Production, ths. Tons	12658	13714	11249	10615	10382
The level of self-sufficiency is based on					
• actual rates,%	129,3	129,1	118,8	118,0	116,1
• rational standards,%	67,8	76,6	64,5	61,3	64,0
Bread and bakery products (in terms of grain)					
Actual consumption fund, thsd.	7748	7750	6808	5897	5745
Fund of consumption on the basis of rational norms, ths.	6265	6338	6178	5771	5745
Production, ths. Tons	24459	38016	39271	60126	66088
The level of self-sufficiency is based on					

Indexes	2000	2005	2010	2015	2016
• actual rates,%	315,7	490,5	576,8	1019,6	1150,4
• rational standards,%	390,4	599,8	635,7	978,9	1150,4
Vegetables					
Actual consumption fund, thsd.	5002	5663	6581	6890	6984
Fund of consumption on the basis of rational norms, ths.	5410	5182	5045	4713	4693
Production, ths. Tons	6195	7606	8873	9792	9998
The level of security is based on					
• actual rates,%	123,9	134,3	134,8	142,1	143,2
• rational standards,%	114,5	146,8	175,9	195,2	213,0
Potato					
Actual consumption fund, thsd.	6660	6386	5914	5892	5966
Fund of consumption on the basis of rational norms, ths.	5411	5180	5047	4714	4694
Production, ths. Tons	19838	19462	18705	20839	21751
The level of security is based on					
• actual rates,%	297,9	304,8	316,3	353,7	364,6
• rational standards,%	366,6	375,7	370,6	415,4	463,4

According to the rational consumption rate (80 kg) of beef and veal, 32 kg (40%) in 2016 consumed 8.1 kg (10.1% of the norm), pork 28 kg (35%), respectively, consumed 19 kg (23.8 %), poultry meat - 20 kg (25%) consumed 23.6 kg (29.5%).

A similar situation is observed in the production and consumption of milk and dairy products. Thus, in 2016, milk production in all categories of farms decreased by 233.9 thousand tons (2.2%) compared to 2015, including 270.3 thousand tons (3.4%) in households. , whereas in agricultural enterprises, on the contrary, increased by 36.4 thousand tons (1.4%).

The consumption of milk and dairy products per one person per year in 2016 amounted to 209.5 kg, with a scientifically substantiated norm - 380 kg.

In 2016, the consumption of milk and dairy products per person in 15 oblasts - from 210 kg in Volyn to 281.4 kg in Ivano-Frankivsk exceeds the average level in Ukraine (209.5 kg).

At the same time, the level of production of the main types of crop production significantly exceeds the normative values. The main reason for such a situation is the unbalanced state policy, which led to the targeting of export-oriented agricultural crops by farms of the corporate sector of the agrarian economy of Ukraine.

Most agricultural enterprises have abandoned the production of livestock products due to its loss-making and lack of effective state support [2].

The predominance of export of raw materials, instead of directing them to the domestic market, not only goes against the capabilities of the latter, but also in view of the current situation in the country becomes a certain threat. At present, the foreign market is seeing a decline in grain prices (food and feed), sunflower, rape and soybeans. At the same time, there is an increase in prices for beef, pork and dairy products - production, which in Ukraine tends to decrease.

One of the main factors of the difficult situation in livestock production, as an industry oriented mainly to meet the needs of the domestic market, is the decline in solvent demand from domestic consumers. This was one of the main reasons why prices for livestock products in the first half of 2017 were lower than in 2016 (by 1.3%) and began to increase only in July 2017 (they were 5% higher than in 2016) year) However, this is much less than inflation, which has already exceeded 16% on an annual basis. As a result, the level of consumption of livestock products per consumer in Ukraine is considerably inferior to similar consumption in the leading countries of the world and is less than the recommended physiological standards.

In 2016, the average monthly total cost of one household was 5720,37 hryvnia per month, and the aggregate consumer spending - 5331,53 hryvnia per month. At the same time, on average, households spent on food a total of 2944.32 hryvnias.

That is, the indicator of economic availability was 51.5% with its 60% threshold criterion. Compared to 2015, this indicator decreased by 1.7 percentage points.

But if we take into account not general, but only consumer total household expenses, then the share of food expenses was 55.3% (in 2015 - 58.9%).

At first glance, it seemed that there was an improvement in the economic availability of our population to food. However, the caloric content of a daily diet of one person was 2990 kcal, protein content in consumed food was 84 g, one of the lowest rates among EU countries and 18% lower than the average level of this indicator in developed countries (103 grams per day), fats - 135 g, carbohydrates - 367 g. Compared with 2015 the caloric content of home-nutrition decreased by 1.3%. The content of carbohydrates in consumed food decreased by 1.9%, of fats by 0.7%, and the protein content did not change (Table 2). At the same time, the caloric content of the ration is still 10% higher than the maximum permissible level for this indicator - 2500 kcal.

The statistical data prove that the average Ukrainian tends to vegetarianism. However, in most cases, this is due not to life beliefs, but mainly to financial opportunities. Thus, in 2016, only 29% of the average daily ration was provided

through the consumption of livestock products, which is almost 2 times less than the level required for a healthy eating (55%).

The share of the population's energy value of daily food intake of less than 2100 kcal in 2016 amounted to 24.2%, in 2015 - 22.9%

Reducing food costs is primarily due to the re-direction of part of households' money to pay for HCS services. In 2015 compared with 2014, the share of population spending on housing and communal services increased by 2.2%. then in 2016, the share of these expenses rose by 4.7 percentage points.

That is, in this case, it is not about improving the economic access to food due to the growing purchasing power of Ukrainians, but about the reorientation of family budgets to pay for HCS, even to the detriment of quality and quantity of food.

Table 2 **Energy value and content of nutrients in households consumed in food (on average per day per person)**

Indicator	All households		Including residing							
			in urban settlements						in the countryside	
			in big cities		in small cities		total			
	2010	2016	2010	2016	2010	2016	2010	2016	2010	2016
Energy value (kcal)	3359	2990	3134	2784	3419	2943	3241	2850	3601	3259
Proteins (g)	93	84	89	81	92	81	90	81	98	90
Fat (g)	153	135	150	131	161	136	154	133	150	139
Carbohydrates (g)	409	367	361	325	409	355	379	338	471	423

With regard to the structure of consumer spending on food, there were no significant changes in comparison with the previous year. The first place is spent on: meat and meat products - 22% (657 UAH per household per month), bread and bakery products - 15% (439 UAH), milk and dairy products - 13% (386 UAH).

According to the results of a household survey on the self-assessment of their income level in January 2017, about 4% of households (by 0.8 percentage points less than in January 2016) reported that their income level did not allow even adequate nutrition to be provided. Among the large households, the share of such households decreased by 8 percentage points. and accounted for 6%.

Rural households have traditionally directed most of the total cost of food to the city than urban (respectively 54% vs. 50%). At the same time, the villagers

consumed more: potatoes - 1.5 times, bread and cereal products - 1.3 times, sugar - 1.2 times, oils and other vegetable fats - by 7%, milk and dairy products - by 5%, vegetables and melons - by 3%. The caloricity of the daily ration of one villager (3259 kcal), as in 2015, was 14% higher than urban.

In the current difficult conditions, the main source of food intake, especially for members of rural households, is a private peasant (subsidiary) household.

Significant role in providing people, especially rural, food products traditionally continued to play personal auxiliary farms (PF). They produced 52% of potatoes consumed in households, about half - other types of fresh, chilled, frozen edible meat, 27,2-32,2% - eggs and vegetables and melons, 22,7% - milk and milk products. (Table 3).

It should be noted that there is a clear differentiation, depending on the income level and the location of the household. So, the largest share of consumed food products received from PF in rural households. In rural households, 91% to 11.5% of these consumed products were produced, and almost all consumed potatoes were consumed. It should be noted that in high-income households (over UAH 4500), located in large cities in 2016, a high level of consumption of other types of fresh, chilled, frozen edible meat and poultry received from a private auxiliary farm was recorded. This fact testifies to the high quality of products produced in the PF.

A detailed analysis suggests that the provision of foodstuffs by the personal subsidiary farm is a source of food for members of households in small and large cities, which significantly differ in the level of aggregate income.

Table 3 Share of consumed foodstuffs produced in private auxiliary farms in rural households, depending on the size of average per capita equivalent total income

Total income per household member per month, UAH	Share of value of consumed products received from PF in the structure of aggregate resources, %	Share in the consumption of products with PF, %								
		Fresh, chilled, frozen beef and veal	Fresh, chilled, frozen pork	Fresh, chilled, frozen meat of poultry	Other types of fresh, chilled, frozen edible meat	Milk	EAggs	Potato	Fruits and berries of all	Vege-tables of all
to 2000	0,5	0,0	0,0	0,1	3,7	0,0	0,8	2,9	1,8	4,5
2001-2500	0,5	0,0	0,0	0,2	2,8	0,3	0,5	3,8	2,2	5,7
2501-3500	0,6	0,0	0,0	1,4	5,5	0,1	0,3	5,0	1,1	4,3
3501-4500	0,5	0,0	0,0	0,1	1,0	0,0	0,2	6,3	2,2	3,7
more than 4500	0,3	0,0	0,0	0,3	11,4	0,2	0,4	1,8	1,8	3,9
Big city	**0,5**	**0,0**	**0,0**	**0,5**	**3,7**	**0,1**	**0,5**	**3,9**	**1,7**	**4,5**
until 2000	4,1	4,4	4,8	7,7	19,2	4,6	10,3	44,8	5,7	34,7
2001-2500	3,7	1,9	6,0	14,8	22,3	13,6	20,8	47,6	6,9	29,8
2501-3500	3,4	0,0	8,0	13,3	43,3	3,6	18,5	42,2	5,1	24,0
3501-4500	3,3	0,0	3,2	15,3	1,0	17,2	21,1	41,8	5,3	22,1
more than 4500	1,8	2,5	9,3	15,9	19,2	10,7	11,0	38,9	3,2	17,2
Small town	**3,6**	**1,9**	**6,1**	**11,6**	**28,2**	**7,8**	**15,5**	**44,4**	**5,7**	**28,2**
until 2000	12,6	14,4	47,9	48,6	54,0	43,5	65,9	92,1	19,4	69,7
2001-2500	12,4	3,0	47,0	52,3	91,5	42,5	71,3	90,8	18,7	65,6
2501-3500	11,3	6,9	45,0	68,9	79,1	46,1	73,6	91,7	19,0	63,0
3501-4500	10,4	17,2	47,7	70,4	68,6	51,8	77,0	92,1	17,5	59,1
more than 4500	7,6	9,9	40,8	61,4	87,0	46,8	71,3	93,6	18,1	62,8
Countryside	**11,5**	**9,1**	**46,3**	**58,8**	**78,2**	**44,8**	**70,5**	**91,8**	**18,9**	**65,7**
Total	**4,9**	**1,4**	**16,7**	**20,7**	**47,2**	**22,7**	**27,2**	**52,7**	**6,9**	**32,5**

It should be noted that the share of most of the consumption of food in rural households does not depend on the value of the total income received. This circumstance indicates the orientation towards self-sufficiency of food products for rural households.

According to the results of the research in the conditions of the manifestation of destructive phenomena in the socio-political life of the growth of the role of personal peasant farms, as the main source of income of the main types of food, especially in rural households. Thus, in 2016, against 2000, there is an increase in the share of consumption of potatoes and eggs, and against - all types of foodstuffs except for bread and bakery products (Table 4).

Table 4 **Share of consumption of main types of products by members of rural households received from personal auxiliary farms, %**

Indexes	Year					2016 y. to	
	2000	2005	2010	2015	2016	2000	2015
Bread and bread products	5,5	5,4	2,1	1,8	1,6	-3,9	-0,2
Meat and meat products	61	39,3	33,2	43,1	45,1	-15,9	2
(in terms of meat)	64,5	43,5	51,7	54,8	55,6	-8,9	0,8
Milk and cheese (in terms of milk)	72,1	71,2	69,5	89,7	90,6	18,5	0,9
Eggs	88,4	95,1	86,6	100,0	100,0	11,6	0
Potato	75,5	60,2	50,6	74,4	71,7	-3,8	-2,7

In the period of mass unemployment in the countryside as a consequence of the crisis, a private peasant economy became the center of labor activity of the able-bodied population, an important source of supply of necessary food and cash. "Until the time when the bulk of our peasant population is in such a state when it comes not to savings, but to the possibility of obtaining daily bread ... .. In this state, only a communal economy can protect a peasant from poverty and homelessness, or in the very poverty - to eliminate the danger of starvation "[3, p. 480].

In the conditions of the economic crisis, which is characterized by the presence of a significant number of unemployed, cash income from the management of PF became the main source of filling the family budget, while saving on its own consumption. It is these features of a natural subsidiary used during his propaganda in 1943 by Eleanor Roosevelt.

According to statistics, in 2009, for the cultivation of land 94.2% of rural households used manual labor, for 17.6% - with a land area of up to 0.5 hectares. Only 13.6% of the surveyed rural households had the technical means for mechanization of production processes in the implementation of agricultural activities. Unsustainable physical labor negatively affects the state of health of the peasant, which is manifested in the growth of diseases of the musculoskeletal and cardiovascular systems, reduction of life expectancy. In addition, in the small-scale production of agricultural products, child labor is widely used, which is unacceptable in large-scale farms. "Small peasants," Kautsky quotes in his paper "Capitalism in Agriculture", a researcher of the rural population in Westphalia, who are overloading their children with work, so that their physical development is delayed; such negative sides do not have hiring "[4].

For each particular PF owner as a household, consumer, it is usually not fundamentally what its effectiveness. He will deal with him even in the most difficult conditions, regardless of any costs. But this happens to a certain limit - to meet their own needs. As A.M. Tarasov notes, "despite the lack of efficiency in terms of the economy, PF today, as an economic institution, performs, first of all, a social function, which is a fundamental basis for the social sustainability of the rural community" [5].

As V.G. Venzher, "to eliminate the causes that caused the existence of an PF, it is necessary to solve two problems: to achieve the full supply of agricultural products and on this basis to meet the needs of rural residents at the expense of social production; to raise personal incomes of peasants for equal work to the average level of real incomes of workers and thus alleviates the cause that leads to the search for additional sources of income, including at the expense of personal subsidiary farms. " [6]

In general, this provision, subject to its extension to all forms of personal subsidiary farms, is appropriate. Indeed, the growth of social production and the growth of incomes associated with it eliminates the need for private farming of peasants. But it is necessary to make a few remarks. First, the growth of production and income must be considered obligatory in a close relationship and in a certain optimal combination. If money revenues increase, but the mass of goods will not be counterbalanced by the corresponding mass of goods, the necessity of conducting a personal economy (even if it is economically unprofitable) will remain, as there will be a shortage of food in the market. So, in our stories there are vivid examples of this scenario (1990-1994). In this case, the stimulus of the functioning of private peasant farms will be not only a problem of providing them to rural households, but also residents of cities. As noted above, households are the main suppliers of food through informal links to urban residents.

On the other hand, the need for this economy can be maintained in separate groups of the population or individual citizens, if there is sufficient level of provision of all products at insufficient level of incomes of citizens. As already noted, for most rural households with a low income, they are the main source of cash and food. Secondly, in our opinion, there can be no reason for the refusal of the PF to erase the differences in the amount of income among the residents of the village and the city. Thirdly, the value of revenues should not only ensure that food needs are met in accordance with existing consumption norms, as well as full satisfaction of material and other needs.

The personal economy of different persons and at various stages of development of society can perform simultaneously all its functions or only some of them. At the same time, it acts as one of the important forms of combining the social and personal interests of citizens at the present stages of development of our society. In general, it should be emphasized that the management of private peasant farms, provided that it is effective, will not negatively affect the development of the social economy, provided that it is effective, and, on the contrary, will increase the activity and standard of living of citizens.

The rejection of a personal economy will occur in the process of objective, systematic movement of economic development of social production, increase its level of socialization. However, this will not happen soon, because still a generation of rural residents has survived.

Despite the high role of PF today, agrarian production, according to E. Serovoi, in the future should largely rely on civilized forms. "The further development of PF will be linked to the macroeconomic trends and the evolution of agricultural enterprises. Economic growth and associated growth in real incomes and social stability, reducing the risk of loss of work, etc. will lead to an increase in the alternative cost of labor in society. This, in turn, will contribute to the reduction of personal auxiliary farms, both urban and rural residents.

On the other hand, the development of former collective farms and state farms in the direction of the concentration of ownership in some hands will also restrict private peasant farms, as new owners of agricultural enterprises will seek to reduce such employment of their employees.

And only in marginal agricultural areas PF will become a form of survival of the rural population, and economic growth can transform some of these PF into commodity farms "[7].

Personal peasant farms are only part of a complex socio-economic organism. But in each of its elements a program of behavior is laid down, which shows the resources of the whole. Will Ukraine be competitive or doomed to lagging behind? The relations in the countryside, as the most conservative sector of our

society, show whether reforms are far advanced, whether they have a chance to succeed and how different their outcomes are in the regions of the country.

4   Conclusions

Asessing the level of self-sufficiency of the population of products of particular animal origin, it should be noted about its critical state, which in future may be a threat to the country's food security. In this regard, it is necessary to introduce a system of state support measures that will be aimed at increasing the production of beef and pork. Measures that are financed from the state budget should have a differentiated approach to each category of agricultural producers.

Unlike existing programs of state support for livestock industries, in our opinion, one of the priority areas of financing the creation of a high-value personal peasant farm that holds 3 or more heads of cattle and cows, in particular mini-farms for the production of dairy and meat products cattle breeding. The main method of support is an additional payment for the growth of cow stock in the amount of 50% of its market value. One of the main conditions for providing such support is the receipt by the farmer of an identification number and related supporting documentation.

In relation to large agricultural enterprises with a population of more than 300 heads, the main programs of direct state support in the amount of 30% for the purchase of complex agricultural machinery, breeding animals of domestic breeding and the costs associated with the construction of industrial premises should operate. Taking into account that this category is the main producer of higher grade milk and extra "Extra" milk, and their technological process meets the requirements of the European Union, it is necessary to stimulate expansion of their production capacity by partial compensation of interest rates on foreign currency loans in the amount of 1-2% and 5- 6% - on loans in national currency, the funds of which will be spent on the development of material and technical base.

The mechanisms of targeted food support in Ukraine are practically not used. The provision of domestic food aid through the sphere of social nutrition in Ukraine is carried out in all subjects, but its level is extremely insufficient. Domestic food aid is considered by us as a form of state social support for the population, aimed at improving the nutrition and achieving its balance, taking into account the recommended rational standards for the consumption of food products, with its division into a system of social nutrition in budget institutions and targeted food support. On the one hand, it solves the problem of reducing poverty, and on the other hand, producers and processors of agricultural products receive a stable long-term order for their products.

Under conditions of economic instability, private peasant farms will be forced to remain at leading positions in food security and will be one of the main sources of cash inflows to the family budget.

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ORGANIZATIONAL AND ECONOMIC FACTORS FOR INCREASING THE SUSTAINABILITY OF GRAIN PRODUCTION IN UKRAINE

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Abstract

The purpose of the article is to solve the following tasks: to analyze the trends of grain production and to determine the optimal indicators of the enterprises for the production of grain; to conduct an analysis of the influence of state regulation instruments on ensuring the sustainability of grain production; to substantiate directions of leveling economic risks of growing of cereals on the basis of diversification of production, harmonization of national standards of Ukraine on grain, insurance of price and natural and climatic risks. The study of the economic information was held and the sustainability of grain production was carried out. It is determined, that the next important component of the economic sustainability of grain production in agricultural enterprises is to ensure the high quality of manufactured products. The methodical approach of the complex estimation was made.

Keywords: *agriculturalenterprise, graincrops, risks, stability, stateregulation.*

JEL Classification: *O 13, Q 17*

1   Introduction

The reference of crisis phenomena in agricultural production leads to a decrease in the level of intensity, which, in turn, leads to a deterioration in the sustainability of grain production in agricultural enterprises. The intensity of grain production is reflected in increasing the return on costs, increasing production volumes for

each unit advancing in the production of resources and improving quality, which contributes to economic sustainability. Increasing the sustainability of grain production should be carried out not only due to quantitative increase of resources, and above all - their rational use, as well as search for ways to ensure the effectiveness of state support to the industry, the use of the benefits of specialization and concentration of production, diversification, and the formation of a risk management system in agricultural enterprises, -economic factors.

2 Data and Methods

When writing the article, data from official statistics, economic reviews, monographs and scientific and analytical articles of domestic and foreign authors, and the reporting of certain agricultural enterprises for the production of grain were used. The processing of economic information was carried out on the basis of the use of methods of economic-statistical analysis, expert evaluations and optimization methods in the process of optimizing the specialization of grain production, the development of diversification and assessment of the impact of state regulation instruments.

3 Results and Discussion

The study found that the dynamics of changes in grain production in the world has a tendency to increase (over the past 50 years, world grain production has more than tripled), which was mainly due to higher yields. However, the intensity of the increase in the yield of cereals in the main producing countries is uneven. In accordance with the adopted classification, the vibration variables are divided into three main groups: weak, if $v < 10\%$; the average if v from 11-25%, and then significant for $v > 25\%$.

So, the average level of grain yield fluctuations is Ukraine, Australia, Russia, as the coefficients of fluctuation are equal to 22.48, 18.46, 12.26%, respectively. High stability of the grain production dynamics per unit of land is observed in China, India, France, where the coefficient of stability of yield levels exceeds 90%.

Table 1 **Trend equation, volatility and yield stability indices of grain crops in selected countries of the world for 1990-2016**

Countries	Trend equation	Oscillation rates		Stability factor,%	Average annual growth rate (downturn),%
		absolute, ts / ha	relative, v%		
China	$Y_{(t)} = 42{,}072 + 0{,}6588\,t$	1,18	2,32	97,7	1,29
USA	$Y_{(t)} = 45{,}071 + 1{,}1248\,t$	4,15	6,96	93,0	1,99
India	$Y_{(t)} = 18{,}522 + 0{,}4179\,t$	0,83	3,45	96,5	1,92
Russia	$Y_{(t)} = t\ 13{,}872 + 0{,}3342$	2,23	12,26	87,7	1,05
Ukraine	$Y_{(t)} = t\ 13{,}872 + 0{,}3342$	6,51	22,48	77,5	1,05
France	$Y_{(t)} = t\ 65{,}247 + 0{,}3003$	3,78	5,47	94,5	0,95
Argentina	$Y_{(t)}\ t\ 23{,}718 += 0{,}9154$	3,21	9,00	91,0	3,23
Brazil	$Y_{(t)} = t\ 16{,}544 + 1{,}1153$	2,33	7,50	92,5	4,13
Australia	$Y_{(t)} = t\ 17{,}662 + 0{,}0418$	3,36	18,46	81,5	0,92
Canada	$Y_{(t)}\ t\ 23{,}106 += 0{,}525$	2,41	8,05	91,9	1,39

Source: Author's calculations.

In order to study the yield stability indices in agricultural enterprises, we calculated the variation indices for the main types of grain crops (Table 2).

Table 2 **Calculation of yield variability of grain crops in agricultural enterprises of Ukraine for 1990-2016**

Indexes	Crops	Including		
		wheat	barley	corn for grain
Average value, ts / ha	29,3	28,9	25,7	39,9
Coefficient of variation in rms deviation,%	29,9	24,2	23,3	41,1
Minimum crop yield, ts / ha	17,4	14,0	14,8	19,0
Maximum crop yield, ts / ha	50,0	41,9	38,1	72,4
Swing variation, ts	32,6	27,9	23,3	53,4
Coefficient of variation (in variational scale),%	111,0	96,6	90,5	134,1

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

According to the calculations in Table 2, there is an average level of yield fluctuation over barley and wheat over the period 1990-2013, and a high level of variation in maize variation. This is evidence of a significant dependence on natural and climatic factors, confirming the high correlation between maximum and minimum values. Thus, wheat is 27.9 centners / hectare, barley - 27.9, corn for grain - 53.4. Also, in our opinion, such fluctuations are also the result of the transition from extensive to intensive cultivation of grain crops by agricultural enterprises. Natural soil fertility, coupled with modern cultivation technologies, allows you to get high yields. For example, in the Dnipropetrovsk region, winter wheat can yield a yield of 5 tons / ha, winter barley - 4 tons / ha, spring barley - 3 tons / ha, winter rape - 2.8 tons / ha , sunflower-2,5 t / ha, corn -7 t / ha, and soybeans-3 t / ha. And this despite the fact that the agricultural seasons 2015-2016 years were characterized by prolonged drought, which negatively affected the yields.

Analyzing the influence of natural and climatic conditions on the yield of the main types of grain crops, we will analyze the variation rates depending on the location in the climatic zones (Table 3).

Thus, the high level of fluctuation of corn yield on grain is observed in the Polissya zone, for all other types of grain crops and climatic zones, the average level is characteristic. This fact indicates that the introduction of modern production technologies that offset the negative impact of natural and climatic factors is a significant factor that influences the value of yield stability indices, which is especially evident in large-scale agricultural enterprises.

The results of the conducted researches indicate that with an increase in the volume of production of grain crops declines during 2006-2016, the level of yield variation is reduced. This circumstance indicates an increase in the level of technological processes in the cultivation of grain, which makes it possible to level the impact of industrial risks.

Table 3 **Indicators of variation of crop yields in agricultural enterprises of Ukraine for 1997-2016**

Indexes	Cereals of everything			Wheat			Barley			Corn		
	Step	Forest-steppe	Polissya	Step	Forest-steppe	Polissya	Step	Forest-steppe	Polissya	Step	Forest-steppe	Polissya
Average value, ts / ha	25,8	35,9	31,8	27,7	33,8	29,6	21,0	26,9	26,4	33,5	51,7	54,0
Coefficient of variation in rms deviation, %	14,2	19,6	15,7	11,1	15,6	18,4	11,3	18,2	16,1	14,3	22,6	30,7
Minimum crop yield, ts / ha	36,9	60,1	57,6	37,2	50,7	47,6	30,8	42,2	45,8	52,5	78,3	80,9
Maximum crop yield, ts / ha	22,7	40,5	41,9	26,1	35,1	29,2	19,5	24,0	29,7	38,2	55,7	50,2
Swing variation, %	87,9	112,7	131,9	94,3	103,7	98,8	92,7	89,1	112,3	114,1	107,7	93,0

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

Thus, in the last group of agricultural enterprises there is a decrease in the value of grain yield variance versus the corresponding indicators in 2006 and 2016, which is a sign of high-tech farming (Table 4).

Table 4 **Dynamics of coefficients of variation of wheat yield depending on wheat production volumes at agricultural enterprises**

Groups of enterprises by volume of production	Year				2016 to		
	2006	2010	2013	2016	2006	2010	2013
up to 5000	52,24	57,76	70,6	59,0	6,8	1,2	-11,6

Groups of enterprises by volume of production	Year				2016 to		
	2006	2010	2013	2016	2006	2010	2013
5001-10000	37,22	47,63	52,85	49,6	12,4	2,0	-3,2
10001-20000	32,73	39,18	49,63	44,9	12,2	5,7	-4,7
20001-50000	30,7	33,99	41,75	38,6	7,9	4,6	-3,2
50001-100000	29,64	35,39	37,95	34,5	4,9	-0,8	-3,4
100001-500000	31,57	32,38	33,87	34,0	2,4	1,6	0,1
more than 500,000	32,15	31,76	30,48	27,7	-4,5	-4,1	-2,8

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

In order to systematize the factors that affect the efficiency and stability of grain production in Ukraine, a correlation-regression model of yield and cost of 1 ts of wheat was constructed. For this purpose, in the first stage, we constructed a matrix of pair coefficients of correlation of yield and elemental costs per 1 hectare of sowing in agricultural enterprises using the following symbols: yield index Y - yield, c / ha; factors: X1 - seed costs per 1 hectare, UAH; X2 - fertilizer expenses per 1 hectare, UAH; X3 - costs for petroleum products per 1 hectare, UAH; X4 - expenses for payment of services of outsized organizations on 1 hectare, UAH; X5 - labor costs with deductions for 1 hectare, UAH; X6 - depreciation costs per 1 hectare, UAH.

The matrix of the pair coefficients of wheat yield correlation with all factors is given in Table 5.

Table 5 **Matrix of pair coefficients of correlation of wheat yield**

	Y	X1	X2	X3	X4	X5	X6
Y	1						
X1	0,1805	1					
X2	0,5459	0,1730	1				
X3	0,2614	0,2837	0,2273	1			
X4	0,2787	0,1459	0,1575	0,0797	1		
X5	0,2188	0,0569	0,0726	0,2295	0,0075	1	
X6	0,2611	0,0787	0,1660	0,1338	0,0035	0,1429	1

Source: Author's calculations.

The calculated pair coefficients of correlation in Table 5 indicates that there is a moderate link between wheat yield and fertilizer costs, while other cost items have a weak correlation.

In order to further study the influence of elemental costs on wheat yield, a multi-factor correlation-regression model was constructed. Parameters of the equation and their estimation were calculated by methods of statistical analysis, namely, "Regression" in the Microsoft Excel environment. The calculations of the probable boundaries use the values of the distribution tables of Fisher and the Investigator with a probability P = 0,95. By Fisher's criterion, the equation is statistically significant: the calculated value is 486.4 more than the table 2.65. True factors of the impact on yield are all items of expenditure per 1 hectare, calculated values of the Student criterion are higher than the 1.96 table.

The presented data show that the relationship between the values of the function and the independent variables (correlation coefficient) R = 0.6327, therefore, the degree of the tightness of the connection between the investigated features is significant.

The unit of measurement of simultaneous influence, caused by the variation of all factors, is the coefficient of multiple determination R2. The determination coefficients for individual factors of influence are calculated by the formula:

$$d_i = a_i \times ryx_i \times Sx_i / S_y \tag{1}$$

where d_i- factor number;

a_i- coefficients of regression of the i-th factor;

r_{yxi} - coefficient of correlation of the sign in with the so-called factor;

S_{xi}- standard deviation of the i-th factor;

S_y -is the standard deviation of the sign Y.

According to the determination coefficients, wheat yield levels (B) by 40.04% depend on the total impact of all investigated factors, including: 0.55% of seed costs per ha (X1); on 24,91% of expenses for fertilizers (X2); 2,11% of the cost of petroleum products (X3); on 5,42% of expenses for payment of services of the third-party organizations (X4); on 3.12% of depreciation expenses (X5); at 3.94% of the labor costs (X6).

Then the total determination coefficient is:.

$$0,55\% + 24,91\% + 2,11\% + 5,42\% + 3,12\% + 3,94\% = 40,04\%$$

Correlation-regression model of the dependence of wheat yield on the listed factors takes the form:

$$Y = 24{,}7890 + 0{,}0007\,X_1 + 0{,}0039\,X_2 + 0{,}0016\,X_3 + 0{,}0024\,X_4 + 0{,}0043\,X_5 + 0{,}0035\,X_6$$

The value of the coefficient of the regression equation (a1 = 0,0007, a2 = 0,0039, a3 = 0,0016, a4 = 0,0024, a5 = 0,0043, a6 = 0,0035) determines the coefficient of increase of the variable Y with increasing Xi on unit relative to the average. Consequently, it can be concluded that for agricultural enterprises, the increase in the cost of seeds, fertilizers, petroleum products, payment for services of outside organizations, depreciation and payment for 1 ha of seed per 100 UAH increase the yield of wheat, respectively, by 0.07; 0.39; 0.16; 0.24; 0.43 and 0.35 c / ha. The most influential factor was exposure to fertilizers. Consequently, we found the stability of the dependence of wheat crop productivity on the elemental costs of production.

At the second stage of the study, a correlation-regression model based on the cost of 1 ts of wheat (Y) and the following factors was constructed: X1 - wheat yield, c / ha ; X2 - seed costs per 1 hectare, UAH; X3 - fertilizer costs per 1 hectare, UAH; X4 - costs for petroleum products per 1 hectare, UAH; X5 - expenses for payment of services of outsized organizations on 1 ha, UAH; X6 - labor costs with deductions for 1 hectare, UAH; X7 - depreciation costs per 1 hectare, UAH.

The matrix of the pair coefficients of the cost of 1 ts of wheat with all factors is given in Table 6.

Table 6 **Matrix of even coefficients of the cost of wheat**

	Y	X1	X2	X3	X4	X5	X6	X7
Y	1							
X1	-0,3064	1						
X2	0,2295	0,1805	1					
X3	0,2465	0,5459	0,1730	1				
X4	0,2072	0,2614	0,2837	0,2273	1			
X5	0,2165	0,2787	0,1459	0,1575	0,080	1		
X6	0,1477	0,2188	0,0569	0,0726	0,230	0,0075	1	
X7	0,1719	0,2611	0,0787	0,1660	0,134	0,0035	0,1429	1

Source: Author's calculations.

Coupling coefficients of correlation reflect the moderate relationship between the cost and yield of wheat, costs have a weak link to the cost. The correlation-regression model of the dependence of the wheat production cost on the listed factors is constructed statistically significant (Fisher's calculation criterion F = 693,31).

The coefficient of multiple correlation R = 0,7254, hence the model explains 52.63% of the variation in cost. However, among all the investigated factors, wheat yield was found to be the most significant factor in the yield of wheat - 15.2%.

The equation of the dependence of the cost of wheat on the investigated factors has the form:

$$Y = 247,08 - 3,539X_1 + 0,026X_2 + 0,019X_3 +)0,022X_4 + 0,018X_5 + 0,026X_6 + 0,024X_7$$

The regression equation shows that the increase in wheat yield by 1 centner per hectare reduces the cost of 1 cent to UAH 3,539, with increasing costs for seeds, fertilizers, petroleum products, payment for services of outsiders, depreciation and pay for 1 hectare of sowing for 100 UAH, the cost of wheat increases respectively 2.6; 1.9; 2.2; 1.8; 2,6 and 2,4 UAH ha 1 ts.

At the third stage of the study, a correlation was found between crop yield and wheat cost (Figure 1). Dependence is described by a parabola of the second order, which shows the deceleration of the values of cost with increasing yield.

Figure 1 **Relationship between yield and production cost of wheat in agricultural enterprises of Ukraine, 2016**
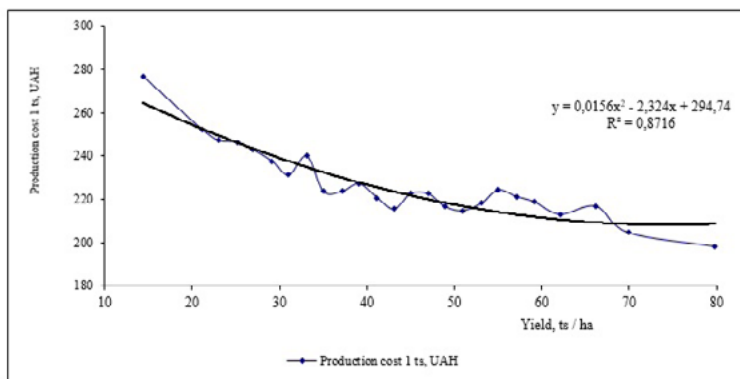
In order to identify the optimal areas for improving the efficiency of wheat (reducing the cost of production), it is necessary to carry out a combined grouping on two main factors - production costs and yield, as they have the greatest impact on the formation of the cost of production (Table 7).

It should be noted that such a regularity of connection between production costs and productivity of production costs is observed also in the production of barley and corn.

Economic stability of grain production in agricultural enterprises depends on the level of its availability by technical means and their specific composition. They

belong to the most active part of the resource potential, which significantly affects the competitiveness of agricultural production and its efficiency. All this is connected with the rational use of other resources - fuel, electricity, own production, and others [1]. In the practical activity of agricultural enterprises, the formation and use of technical resources is in such a contradiction: on the one hand, it is necessary to provide technical resources in the necessary structure, and, on the other hand, the economy is limited in their acquisition for a long period and, accordingly, there are difficulties in their effective use. This should be considered as a condition for increasing the volume of agricultural production, improving the financial situation of agricultural enterprises, and increasing the incomes of commodity producers.

Table 7 **Grouping of agricultural enterprises at the level of production costs per 1 hectare / UAH**

Groups by production costs per 1 hectare, UAH	Yield, ts / ha	The share of enterprises,%	Costs of 1 hectare, UAH	Yield, ts / ha	Production cost 1 ts, UAH
to 5000	to 25	6,7	3512	16,9	207,31
	25,1-50	4,6	4142	32,9	125,83
	more 50	0,4	3702	55,1	67,22
	Total	**11,7**	**3794**	**24,9**	**152,37**
5001-9000	to25	5,3	6205	21,7	285,98
	25,1-50	31,3	7307	36,4	200,82
	more 50	3,6	7760	57,6	134,67
	Total	**40,2**	**7256**	**37,1**	**195,55**
more 9000	to 25	0,4	10990	21,1	520,46
	25,1-50	23,7	11016	42,0	262,30
	more 50	24,0	13864	61,8	224,34
	Total	**48,1**	**12619**	**53,1**	**237,77**
	In Ukraine	**100,0**	**9986**	**45,1**	**221,42**

Source: Author's calculations.

It should be noted that in the leading countries where there is a high level of production efficiency, this issue is given top priority. Over the past 15 years, the energy intensity of agricultural production in Ukraine has been reduced by 15%. At the same time, energy consumption in the USA, France, Britain, Japan decreased

by 70-78%. Energy analysis provides an opportunity to obtain a comparative assessment of agricultural technology and a complex of machines taking into account the costs of different types of energy at all stages of agricultural production [2].

The insufficient level of technical support for the production of grain determines the manifestation of technical and technological risks. Thus, 78% of the country's combine park is outside the amortized and economically expedient period of exploitation. Annual losses due to the untimely harvest of more than 6 million tons of grain, which, on average, is equivalent to 12 billion UAH [3].

According to the results of the survey, it turned out that 40.5% of respondents are conducting or trying to manage price risks, the rest - 59.5% - do not use risk management tools at all. It should be noted that respondents among the tools for managing price risks distinguish: state programs - 51%, insurance - 20%, lending on a mortgage - 18%, and forward contracts - 11%. The main instrument of insurance of price risks of grain crops by agricultural commodity producers is the conclusion of agreements with the Agrarian Fund.

An important factor contributing to the economic sustainability of grain crops is the effective state policy for agricultural enterprises - grain growers. During 2011-2017 there were tax collisions regarding the mechanism of the special VAT regime in the export of grain and oilseeds.

For producers of export-oriented agricultural products (primarily grain crops - wheat, corn, barley, and rape), it was more economically advantageous to restore the zero rate when taxing export supplies.

In the case of resumption of the zero VAT rate, when exported, the purchase price could increase as much as a percentage of VAT, which would have a positive impact on the incomes of producers of such export-oriented products. And they have an absolute majority in Ukraine - more than three quarters of the total number of agricultural enterprises. Even taking into account the cost of money for three to four months, which "hangs" financial resources of grain traders between the period of purchase of a batch of grain and the actual receipt of VAT refunds from the budget, as well as the existing risks of non-reimbursement of VAT due to the recognition of "insignificant" operations for the purchase of individual lots of grain and the cost of "persuading" the fiscal in the need to return, purchasing prices of grain traders would have increased by at least 13-15%.

Instead, the operation of a special VAT regime for producers of export-oriented products provided only about 10-11% of additional financial resources. Accordingly, the decision to abolish the special VAT regime and restore the zero rate for exports guaranteed the producers of export-oriented agricultural products at least 3-4% of additional revenues.

Given the obvious benefits for cereal producers, unity was not observed in positions - if livestock farming was of the utmost importance to maintain the special VAT regime, given the higher value added than in crop production, the recovery of export oriented producers was more urgent zero VAT rate when exporting (so-called VAT refund). Simultaneous application of special regime of VAT and zero rate regimes for export was excluded.

4   Conclusions

Consequently, the main direction of leveling out the economic risks of growing crops and ensuring the sustainability of agricultural enterprises is the diversification of the production of grain crops. Today, the diversification of the grain industry can be achieved by producing high protein crops: peas, soybeans, beans, nut and cereals: millet and buckwheat, as well as forage crops: stomatosis of the direct, stonecrosis, honeydew, alfalfa, espresso and chives.

The next important component of the economic sustainability of grain production in agricultural enterprises is to ensure the high quality of manufactured products. One of the obstacles to the sustainability of the development of grain crops is the lack of unity in standardizing the products sold between domestic and European legislation. The main directions of harmonization of the national standards of Ukraine for grain should be: harmonization of requirements to the indicators of quality; harmonization of quality control methods; harmonization of the principles of recognition of test results and certificates.

The directions of achievement and increase of economic stability of agricultural enterprises for grain production are grounded, taking into account the results of estimation of its parameters, the level of adaptation to the changing changes of the external and internal environment on the basis of modernization of the state regulation instruments of the industry and the full use of internal reserves by the commodity producers for increasing the efficiency of production, as well as strengthening information-analytical function of economic regulation. Among the instruments of a flexible system of state support and regulation of the investigated industry, priority should be given to: subsidizing interest rates on commercial bank loans; financing of targeted programs, compensation of part of the cost of grain crop insurance as a result of price and weather risks, harmonization of national standards for grain, support of export activity.

The main organizational and economic directions of ensuring economic stability of grain production at the enterprise level are: observance of scientifically grounded requirements to the structure of grain sown area taking into account

the region; development of specialization and diversification of activities, strategic and tactical planning of production.

In order to increase the effectiveness of managing the economic stability of agricultural enterprises for the production of grain, it is expedient to create an organizational subsystem within the framework of a general management system in which the important components are risk management and a system of quantitative indicators. The methodical approach of the complex estimation of the potential of the agricultural enterprise for ensuring the sustainability of grain production is proposed, which will enable the use of operational management tools such as organizational-coordinating, informational-analytical and planning, ensuring the balance of interests of structural and functional subsystems, which will increase economic stability in the long-term perspective.

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EFFECT OF MANGOLD POWDER ON COLOR AND FLAVOR FORMATION IN MUSCLE PORK PRODUCTS

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Abstract

Processing of vegetables with high sodium nitrate content is of interest for the production of meat products without addition of nitrite. However, the use of nitrate-containing vegetable powders requires the changes in technological parameters. The aim of the study was to investigate the effect of mangold powder on the formation of organoleptic characteristics of muscle meat products. The subjects of the study were the samples of meat products, i.e. smoked-cooked pork neck: control with nitrite and salting mixture; experiment No. 1 with mangold powder and ascorbic acid-containing fruit powder; experiment No. 2 with mangold powder and ascorbic acid. To transform the nitrate ions contained in the mangold vegetable powder into nitrite ions using denitrifying culture, a preliminary heat treatment step was used: 1 and 2 hours at 40±2 °C followed by thermal treatment according to conventional technology. Samples were stored for 1, 5, and 11 days at 0-6 °C. As a result of pork neck ageing for 2 hours at 40 °C, a uniform pink color of pork products with vegetable powder was formed. Indicators of instrumental flavor evaluation in the investigated samples of pork products did not differ significantly. Color of the sample No. 1 had higher values of redness and yellowness. Samples with mangold powder were characterized by a higher color stability compared to the control. Mass fraction of sodium nitrite in the test samples after 1 day of storage was 64.5% and 50.0% higher compared to the control. As a result of pork products storage, the differences in the content of sodium nitrite in the control and in the samples from experiments No. 1 and No. 2 disappeared. During storage up to Day 11, the mass fraction of sodium nitrite in the test samples No. 1 and No. 2 decreased by 34.8% and 66.1%, respectively.

1   Introduction

Sodium nitrite is an essential ingredient in the production of meat products due to its multifunctionality (color formation, preserving and antioxidant capacity, participation in flavor formation). The dosage of sodium nitrite is strictly limited by the current legislation because of the negative effect of its excess on human health. However, there is a positive effect of sodium nitrite on the improvement of cardiovascular system (Larsen, Ekblom, Sahlin, Lundberg & Weitzberg, 2006). As natural sources of nitrite, nitrate-containing vegetables are widely used in the production of raw dried meat products (Sindelar, Cordray, Sebranek, Love & Ahn, 2007a, and Eisinaite, Vinauskiene,Viskelis and Leskauskaite, 2016) and cooked sausages (Sindelar, Cordray, Sebranek, Love & Ahn, 2007b) in various countries around the world. Vossen, Utrera, De Smet, Morcuende & Estévez (2012) found that rosehip *Rosacanina L.* may be used as an antioxidant, but does not completely replace sodium nitrite in sausages due to decrease of redness in the absence of nitrite. Krause, Sebranek, Rust and Mendonca (2011) investigated the effect of the vegetable juice powder in brine composition on the color and content of residual nitrite in ham. The results of the studies found a higher a* (redness) index and a higher residual nitrite level in the control sample with sodium nitrite compared to the samples with vegetable juice powder. Studies of the products containing natural nitrate as a substitute for the food additive of sodium nitrite indicate a positive effect of the celery juice concentrate on the physicochemical and microbiological parameters of ham (Horsch, Sebranek, Dickson, Niebuhr, Larson, Lavieri, Ruther & Wilson, 2014). Tsoukalas, Katsanidis, Marantidou and Bloukas (2011) suggested the use of freeze-dried leek powder to reduce sodium nitrite in fermented sausages by 50%. However, in the scientific and technical literature there is no data on the appropriateness of using nitrate-containing vegetable powders in the production of smoked-cooked meat products, which are conventional products on the Russian market. In addition, the technology of meat products with vegetable powders is of interest from the point of view of processing vegetables with excess nitrate levels and their further use.

For more complete consumption of sodium nitrite for color formation and for decreasing its residual amount in the finished product, various reducing agents are used, i.e. ascorbic acid and its derivatives. When using nitrate-containing

components, it is necessary to implement a number of additional techniques, for example, the stage of preliminary heat treatment, denitrifying cultures necessary for complete transformation of nitrate ions into nitrite ions, correct color formation process and minimum residual sodium nitrite content. Thus, the aim of the study was to investigate the effect of nitrate-containing mangold powder on the color formation in smoked-cooked pork products without sodium nitrite.

2   Materials and methods

Subjects of the study were samples of smoked-cooked pork neck, for the production of which pork neck was injected with brine in an amount of 30.0%of the meat weight. Brine formulation is presented in Table 1.

Table 1 **Formulations of smoked-cooked pork neck samples**

Ingredients	Brine specification, kg/100 L		
	Control	**Sample No. 1**	**Sample No. 2**
Water	89.53	88.30	89.57
Table salt	2.8	8.3	8.3
Salting mixture (with sodium nitrite content of 0.6%)	5.5	-	-
Granulated sugar	1.0	1.0	1.0
Ascorbic acid (E300)	0.17	-	0.17
Mangold vegetable powder	-	0.87	0.87
Ascorbic acid-containing fruit powder	-	0.44	-
Bactoferm CS-299 denitrifying culture *	-	0.087	0.087
Phosphates (E450, E451)	1.0	1.0	1.0
* contains *Pediococcus pentosaceus, Staphilococcus carnosus, Staphilococcus xylosus, Lactobactillus sake Deb. Hanseni*.			

Source: Author's calculations.

Before the addition of mangold vegetable powder to the brine, in order to avoid clumping and to facilitate mixing process, it was previously dissolved in a small amount of cold water with a temperature of 5±2 °C. The solution was characterized by a dark brown opaque color.

Further, the solution of mangold vegetable powder was added to the brine with slow stirring. Other ingredients, i.e. sodium chloride, food phosphates, sugar, and

denitrifying culture, were added after the addition of vegetable powder. Ascorbic acid and ascorbic acid-containing fruit powder were added at the end of the brine preparation. No precipitate was observed.

To transform the nitrate ions contained in the mangold vegetable powder into nitrite ions, a preliminary heat treatment step was used: 1 and 2 hours at 40±2 °C followed by thermal treatment according to conventional technology.

After production, the samples wrapped in parchment were stored during 11 days under refrigeration conditions at 0-6 °C and relative humidity of 75-78%.

The definition of flavor "visual imprints" was carried out with the VOCmeter (Electronic nose). For the evaluationwith the VOCmeter, three subsamples were taken from each analyzed sample. To obtain the subsample, the analyzed sample (excluding the surface layers) was ground and appropriate quantity was placed in a special glass container (vial). Vialwas tightly closed and placed in a thermostat. At the end of thermal conditioning, needle was inserted into vial for automatic sampling of the analyzed gas, which was supplied to the VOCmeter. To visualize the results of the study, the readings of the MOS1-4 sensors were used. Determination of the color characteristics of meat products within the CIELab system was carried out using the Spectroton spectrocolorimeter while simultaneously measuring the reflection coefficients of the samples at 24 fixed wavelengths located in increments of 13 nm in the visible spectral range from 380 to 720 nm. Then, mathematical processing of measurement results was carried out by a microprocessor controller in the measuring unit.

To determine the stability of color during storage, the color stability test criterion (U,%) was used. Stability of color was calculated by the equation (1):

$$U = \ 1 - \ \frac{|L_1 - L_2|}{3L_1} + \ \frac{|a_1 - a_2|}{3a_1} + \ \frac{|b_1 - b_2|}{3b_1} \ 100 \qquad (1)$$

where: L_1, L_2 - lightness value before and after storage;
  a_1, a_2 - redness value before and after storage;
  b_1, b_2 - yellowness value before and after storage.

The mass fraction of sodium nitrite was determined by a method based on the reaction of nitrite with N-(1-naphthyl)-ethylenediamine dihydrochloride and sulfanilamide in a protein-free filtrate and subsequent photocolorimetric determination of the color intensity.

3   Results and discussion

To convert nitrate ions into nitrite ions, the conditions that are provided by the presence of denitrifying culture, the temperature and maintenance of the conditions

created for transformation are necessary. The color formation reaction is activated when the product is heated above 30 °C and maintained up to 50 °C. With further increase of temperature to 60-70 °C, nitrosomyoglobin and nitrosohemoglobin lose their protein part due to denaturation and transform into nitrosohemochromogen and nitrosomiochromogen responsible for a red color of the meat product. In the absence of nitrite ions, the color formation reaction proceeds up to the formation of metmyoglobin, and the finished product will have gray color after heat treatment, which is unacceptable for most types of traditional meat products.

The described color formation mechanisms were taken into account when optimizing the transformation conditions of the vegetable powder during the aging in a thermal chamber. Therefore, in order to achieve uniform color, the pork neck was held at 40±2 °C for 1 hour and 2 hours. Ageing for 1 hour was insufficient to achieve a uniform pink color in a test sample section. The control sample was characterized by a uniform pink color.

Ageing of the samples for 2 hours at a temperature of 40 °C provided the formation of a uniform pink color of the test samples with vegetable powder. Thus, for the production of muscle pork products, additional ageing is necessary for 60 minutes at 40 °C for nitrate transformation.

After reaching a temperature of 72±2 °C, all of the samples were characterized by a color conventional for pork products. Based on the conducted studies, the modes of additional preliminary stage of heat treatment were established for smoked-cooked pork products to ensure the transformation of nitrate ions in the vegetable powder into nitrite ions with participation of denitrifying culture: at least 1 hour at 40 °C.

As a result of sensory evaluation, it was established that during storage, all of the samples studied had similar and acceptable consumer characteristics conventional for this type of meat products. During storage for 5 days, the samples were characterized by pink and red color of muscle tissue typical for this kind of meat products. The fat layers were white. By Day 11 of storage, samples were characterized by darkening.

Some differences were noted in color, which was more uniform in the control than in the test samples, and in flavor, i.e. sample 1 had higher flavor intensity than the control and sample 2.

Instrumental assessment of color characteristics indicated the absence of significant differences in lightness, redness and yellowness of the control and the test samples of cooked sausages No. 1 and No. 2 (Table 1). However, the color of the sample No. 1 was characterized by a higher value of redness and yellowness ($p < 0.05$).

The results of instrumental color assessment of the samples are given in Table 2.

Table 2 **Color parameters of smoked-cooked pork neck samples**

Sample designation	Color characteristics, color units			Color stability during storage, %
	L - lightness	a - redness	b - yellowness	
Day 1				
Control	56.9 ± 1.7	9.5 ± 0.4	9.1 ± 0.3	-
Sample 1	54.9 ± 1.2	10.5 ± 0.4	12.1 ± 0.6	-
Sample 2	55.6 ± 1.6	9.7 ± 0.5	11.4 ± 0.5	-
Day 5				
Control	55.6 ± 1.4	9.6 ± 0.3	8.6 ± 0.4	98.6
Sample 1	54.2 ± 1.4	10.5 ± 0.6	10.1 ± 0.4	95.9
Sample 2	55.9 ± 1.7	9.9 ± 0.3	10.8 ± 0.5	97.7
Day 11				
Control	59.6 ± 1.1	10.1 ± 0.2	11.8 ± 0.3	89.6
Sample 1	54.3 ± 0.9	11.4 ± 0.5	12.7 ± 0.3	94.9
Sample 2	56.5 ± 1.8	8.5 ± 0.6	10.4 ± 0.4	93.5

Source: Author's calculations.

By Day 5 of storage, the samples had high color stability; losses were only 1.4% to 4.1%. By Day 11, this indicator in samples No. 1 and No. 2 was significantly better compared to the control: their color loss was 5.1% to 6.5%, while color loss in the control was 10.4%.

The results of multisensory studies of pork neck samples are given in Table 3.

Table 3 **Areas of "visual imprints" of the sensor readings obtained with multi-sensory analysis of smoked-cooked pork neck samples**

Sample designation	Visual imprints area, $S_{BO}*10^7$	
	After 1 day	After 5 days
Control	22.2 ± 2.7	23.6 ± 2.4
Sample 1	27.5 ± 3.4	29.5 ± 3.2
Sample 2	25.0 ± 2.8	27.3 ± 3.1

Source: Author's calculations.

The results of M1-M4 sensors, which characterize the content of volatile flavor-forming components in the gas phase of the samples, did not differ significantly between the samples ($p > 0.05$).

Table 4 shows the study results of pH level. The control and the sample No. 1 had no significant differences in pH value (p >0.05). The sample No. 2 was characterized by a lower pH level compared to the control and the sample No. 2. (p <0.05), which, however, did not affect the sensory evaluation.

Table 4 **pH levels in smoked-cooked pork neck samples**

Sample designation	pH		
	Day 1	Day 5	Day 11
Control	6.27 ± 0.05	6.36 ± 0.07	6.49 ± 0.09
Sample 1	6.29 ± 0.08	6.33 ± 0.03	6.34 ± 0.08
Sample 2	6.04 ± 0.03	6.01 ± 0.04	6.01 ± 0.05

Source: Author's calculations.

During the storage, pH values of pork neck samples increased: for the control - by 3.4%, for the sample No. 1 - by 0.8%, while pH level of the sample No. 2 remained virtually unchanged.

Table 5 shows the results of sodium nitrite, sodium nitrate and ascorbic acid mass fraction evaluation.

Table 5 **Sodium nitrite mass fraction in smoked-cooked pork neck samples**

Sample designation	Sodium nitrite mass fraction, %
Day 1	
Control	0.00110 ± 0.00015
Sample 1	0.00181 ± 0.00013
Sample 2	0.00165 ± 0.00011
Day 5	
Control	0.00098 ± 0.00011
Sample 1	0.00154 ± 0.00018
Sample 2	0.00132 ± 0.00012
Day 11	
Control	0.00078 ± 0.00008
Sample 1	0.00118 ± 0.00012
Sample 2	0.00056 ± 0.00009

Source: Author's calculations.

During the storage, none of pork neck samples exceeded the specifications for sodium nitrite mass fraction, i.e. 0.005%.

When added to the meat system, sodium nitrite is reduced to nitric oxide and reacts with meat myoglobin. Amount of nitrite ions formed from nitrate ions of the used doses of vegetable powder was sufficient for desired pink-red color of the product.

During the storage, all smoked-cooked pork neck samples corresponded to the regulatory requirements of Russian legislation for the content of sodium nitrite of no more than 0.005%. Decrease in residual sodium nitrite content was observed in all samples. In the test samples with mangold powder, more intensive dynamics of nitrite level decrease was observed. After 11 days, mass fraction of sodium nitrite in the test samples No. 1 and No. 2 decreased by 34.8 and 66.1% ($p < 0.05$), respectively. After 5 days, the content of nitrite in the control did not change ($p > 0.05$) while after 11 days of storage, the mass fraction of sodium nitrite in the control decreased by 29.1% ($p < 0.05$). After 1 day of pork product storage, the mass fraction of sodium nitrite in the test samples was 64.5% and 50.0% higher compared to the control ($p < 0.05$). However, during storage, the value of sodium nitrite mass fraction in all of the test samples equalized and no significant differences were observed ($p > 0.05$). It is explained by the transformation of nitrogen oxide formed into nitrate under the influence of oxygen.

4   Conclusions

Based on the results of the studies, the preliminary heat treatment modes are established for smoked-cooked pork products to ensure the transformation of nitrate ions in mangold vegetable powder into nitrite ions with participation of denitrifying culture: at least 2 hours at 40 °C. During the storage, the control and the test samples had similar and acceptable consumer characteristics conventional for this type of meat product, which was confirmed by sensory evaluation and instrumental analysis of color and flavor after production and during the storage. The content of residual nitrite and nitrate in the samples with natural sources of nitrate corresponded to the regulatory requirements.

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GRADATION OF EUROPEAN UNION MEMBER STATES IN TERMS OF ORGANIC FARMING DEVELOPMENT IN THE LIGHT OF A MULTIVARIATE COMPARATIVE ANALYSIS

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Abstract

The main objective of the paper is to attempt to analyse the regional diversity of organic farming in EU Member States in 2015 in terms of selected characteristics. There were used such characteristics as: average surface area of organic cultivations, share of the surface area of organic cultivations in the total area of arable lands, value of retail sale, expenses for organic food per capita. Using the selected linear ordering method of a set of objects, a ranking of states was drawn up. The ordering procedure was selected using an auxiliary procedure, based on the similarity measure of ordinal systems.

Keywords: *linear ordering methods, multivariate comparative analysis, organic farming*

JEL Classification: *Q10, Q12, Q15, C2, C4*

1 Introduction

The modern food sector is dominated by highly efficient production techniques offering mass products on the global market (Bareja-Wawryszuk & Gołębiewski, 2014). Intensive production, as well as transportation possibilities, guarantee great availability of food products from all over the world.

Zegar (2012) claims that society is paying significant costs for devastating industrial food systems. In his opinion, the environmental and social costs of globalised agriculture are substantial and cover loss of fertile soil, air and water pollution, loss of biodiversity, dependence on non-renewable resources, and food quality deterioration. However, recent observation shows that consumers have started to show interest in alternative food networks supporting local production. Organic agriculture is being developed as a response to the chemicalisation of agriculture (Paull, 2011).

Organic farming can be defined by the proactive, ecological management strategies that maintain and enhance soil fertility, prevent soil erosion, promote and enhance biological diversity, and minimise risk to human and animal health and natural resources (Organic Farming Research Foundation [OFRF], 2018). A modern definition of organic farming, provided by Lampkin (1994), states that the aim is: "to create integrated, humane, environmentally and economically sustainable production systems, which maximise reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human nutrition, protection from pests and disease, and an appropriate return to the human and other resources".

The reason for the focus on organic agriculture is the rapid development of the organic sector in Europe. Organic agriculture is gaining popularity in the perspective of the concept of sustainable consumption. From the sustainability perspective, most of the policy and research attention concentrates on shifts toward more sustainable food products and on food losses (Ratinger, Hebaková, Michálek, Tomka, Mrhálková & Stiková, 2014). This development has resulted in the growth in consumer demand for environmentally friendly, "green" or chemical-free food products. It has led to an expansion of organic farms in Europe.

Many authors emphasise that the organic way of production is an important feature of plant cultivation and animal husbandry. To breed animals on an organic farm means either to feed them with the farmer's own silage and hay, or to purchase organic concentrate feeds (Ratinger, Abrahamová, Boudný, Foltýn, Hruška, Pražan & Voltr, 2013), (Flaten, Lien, Koesling, Valle & Ebbersvik, 2005). If you want to have your own organic forage, it will cause the increase of the area of organic farms, which can be seen nowadays in countries of the European Union. It is also important to fertilise crops with natural fertilisers, which is noted by Tiedemann and Latacz-Lohmann (2012).

The production of organic food has been developing both in well-developed countries as well as in developing countries, which see export possibilities in the development of this type of production. It is also a chance to manage workforce

surpluses, increase in income and development of fragmented farms (Willer & Yussefi, 2007).

The first principles of functioning of organic farming, which have become the basis for the first international regulation on organic farming and labelling of its products, were created by the International Federation of Organic Agriculture Movements established in 1972 (IFOAM, 2007). The underlying principles, on which organic agriculture is based, adopted by IFOAM are: health, ecology, fairness, and care. Currently, the framework for all levels of production, distribution, control, and labelling in the European Union is determined by the Council Regulation (EC) No. 834/2007, which is continuously updated in the form of regulations amending this Regulation. In Europe, all countries have an organic regulation or are drafting one. The EU Common Agricultural Policy (CAP) and similar programmes in other countries remain a key policy for the development of agriculture in Europe, including organic farming. Under the current CAP for the period of 2014-2020, organic farming is supported by Pillar1 (direct payments) and Pillar2 (Rural Development Programmes).

The main objective o the paper is to attempt to analyse the regional diversity of organic farming in EU-28 states in 2015 in terms of selected characteristics. The paper consists of three main parts. The first one presents the selected definitions of organic farming and changes in the surface area of organic cultivations in Europe, as well as the development of the healthy food sales market. Then, it describes the selected linear ordering methods and selected formulas used for variable standardisation. The final part presents the ranking of European countries in terms of the development of organic farming, which will enable assignment of particular countries to groups with well-developed, poorly developed and developing organic agriculture.

Data presented in this paper come from the study of literature as well as contain information presented by The World of Organic Agriculture, Eurostat and European Commission reports.

1.1   Development of organic area and retail sales

The demand for organic products mainly concentrates in Europe and North America. In most countries, only a small consumer base is responsible for most organic food purchases. The challenge of organic food marketing lays in adjusting to consumer preferences in the various countries and the concern about supplies of organic products. In 2015, the countries with the biggest organic markets were the United States (35.8 billion euros, 47% of the global market) followed by the European Union (27.1 billion euros, 35%), especially Germany (8.6 billion euros) and France (5.5 billion euros).

The highest per-capita consumption, with more than 170 euros, was found in Switzerland, Denmark, Luxembourg, and Sweden. The highest organic market shares were reached in Denmark (8.4%), Switzerland (7.7%), and Luxembourg (7.5%) (FiBL 2018).

In 2015, as compared to 2004, both the surface area of organic cultivations and the share of arable lands of organic farms in the total area of arable lands in the European Union were systematically growing (Figure 1), as evidenced by the matching trend lines, with the surface area of organic cultivations increasing in this period by 85.34% and the share of the surface area of organic cultivations in the area of arable lands increasing from 3.28% in 2004 up to 6.17% in 2015.

Figure 1 **The course of changes in the surface area of organic farms and the share of arable lands of organic farms in the total area of arable lands in the EU in the period of 2004-2015**

$$\hat{y}_t = 5.47 + 0.47t, \quad R^2 = 0.99$$

$$\hat{y}_t = 3.00 + 0.27t, \quad R^2 = 0.99$$

◇ area [mln ha]   ■ area, share of total [%]
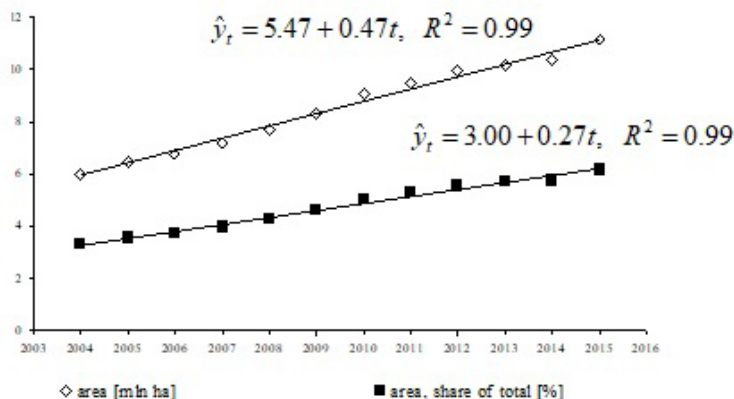
Note: Designated trend lines: $t = 1, 2, …, 12$.
Source: own calculation based on FiBL survey 2017 www.organic-world.net retrieved 20.01.2017.

Buying organic food has become very popular over the past 10 years, especially in well-developed countries, hence the growing interest in organic production among farmers and the increasing number of farms involved in farming and breeding in the organic system, and thus an increase in sales of organic products (Figure 2).

Figure 2 **The course of changes in the number of organic producers, the value of retail sale of organic products in the EU in 2004-2015**

$$\hat{y}_t = 8.32 + 1.45t, \quad R^2 = 0.99$$

$$\hat{y}_t = 1.05 + 0.14t, \quad R^2 = 0.92$$

● number [100thousand]   △ retail sales [bilion euro]
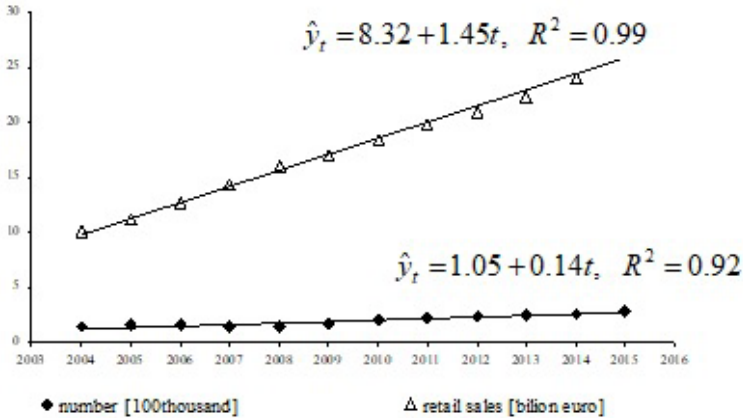
Note: Designated trend lines: $t = 1, 2, …, 12$.
Source: Prepared by the authors on the basis of: www.organic-world.net Retrieved 20.01.2017.

The number of organic producers in 2015, as compared to 2004, increased by 129.85%. The value of sales of organic products on the European market in 2015, as compared to 2014, increased by 11.8%, and it was the highest growth since the financial crisis of 2008. Throughout the entire analysed period, the value of sales of organic products increased by 171%.

The value of expenses for organic products per capita also increased. Thus, the consumers' demand for high-quality products has been increasing. However, it should be noted that it is very diverse in particular EU Member States. In old states of EU-15, it amounted to EUR 65.9 on average, while among countries that joined the European Union after 2004 - only EUR 5 per year. Switzerland, Denmark and Sweden, with expenses at the level above EUR 150, are the leaders in consumption of organic products. While in countries such as Slovakia, Lithuania or Latvia, the expenses for organic products amounted to EUR 2 per capita (Willer & Lernoud, 2017).

The purpose of the article is to attempt to analyse the regional diversity of organic farming in EU-28 states in 2015 in terms of selected characteristics. The linear ordering method was used to describe the examined phenomenon. The purpose of these methods is to arrange objects from the best to the worst one in terms of a defined criterion. The results obtained using several linear ordering methods

frequently vary among each other. In some comparisons of pairs of methods, the differences are very clear. Consequently, a dilemma appears: which ordering method should be chosen. The article uses an auxiliary procedure of selection of the linear ordering method. This procedure is based on the similarity measure of rankings obtained as a result of applying several linear ordering methods.

The synthetic measure, selected from the initial list of methods, allowed for arranging EU Member States in terms of the level of development of organic farming.

2   Data and Methods

The analysis was conducted on the basis of the data originating from Reports of The World of Organic Agriculture and the database of EUROSTAT.

The choice of variables was guided by the substantive analysis and the availability of data. When preparing characteristics in the form of indicators, the impact of the size of the examined objects was excluded.

The diagnostic variables adopted for the analysis are as follows: X_1- average surface area of organic cultivations [ha], X_2- share of the surface area of organic farms in the total surface area of agricultural farms [%],X_3- the annual amount allocated on organic food [EUR/inhabitant], X_4- the sale of organic products in the total sale of food products, X_5- the percentage of food processors among organic producers.

The statistical data, on the basis of which the analysis was conducted, form a matrix:

$$[x_{ij}]_{\substack{i=1,2,\dots,n \\ j=1,2,\dots,m}} = \begin{matrix} x_{11} \ x_{12} \dots x_{1,m} \\ x_{21} \ x_{22} \dots x_{2,m} \\ \dots \ \dots \ \dots \ \dots \\ x_{n,1} \ x_{n,2} \dots x_{n,m} \end{matrix} \tag{1}$$

where: *Xÿ*- value of the feature *Xj* for the *i* country, *m*- number of diagnostic variables, *n*- number of states.

In the first stage of the research, four linear ordering procedures were selected (Table 2). Then, four rankings of the examined objects were drawn up on their basis.

Table 2 **Selected linear ordering methods**

Method	Synthetic variable	
Hellwig's	$Q_i = 1 - \dfrac{d_i}{d_0}$	$d_i^+ = \sqrt{\sum\limits_{j=1}^{m} (Z_{ij} - Z_j^+)^2}$, $z_j^+ = \max\limits_i\{Z_{ij}\}$, $Z_{ij} = \dfrac{X_{ij} - \overline{X}_j}{S_j}$, $d_0 = \overline{d}$ $\overline{d} + 2S_d$, $\overline{d} = \dfrac{\sum_{i=1}^{n} d_i^+}{n}$, $S_d = \sqrt{\dfrac{\sum_{i=1}^{n}\left(d_i^+ - \overline{d}\right)^2}{n}}$
TOPSIS	$Q_i = \dfrac{d_i^-}{d_i^- + d_i^+}$	$d_i^+ = \sqrt{\sum\limits_{j=1}^{m}\left(z_{ij} - z_j^+\right)^2}$, $z_j^+ = \max\limits_i\{z_{ij}\}$, $d_i^- = \sqrt{\sum\limits_{j=1}^{m}(z_{ij} - z_j^-)^2}$, $z_j^- = \min\limits_i\{z_{ij}\}$, $z_{ij} = \dfrac{x_{ij} - \overline{x}_j}{S_j}$
MUZ	$Q_{1=\frac{1}{m}\sum_{j=1}^{m} z_{ij}}$	$z_{ij} = \dfrac{x_{ij} - \min\limits_i x_{ij}}{\max\limits_i x_{ij} - \min\limits_i x_{ij}}$
SSW	$Q_1 = \dfrac{1}{m}\sum\limits_{j=1}^{m} z_{ij}$	$z_{ij} = \dfrac{x_{ij} - \overline{x}_j}{S_j}$

Note: X_{ij} - value of the j variable for the i object; Z_{ij} - normed value of the j $\overline{x}_j$, S_j variable for the i object; is, respectively, the arithmetic mean and the standard deviation of the j variable; Q_i - value of the synthetic variable for the i object

Source: Prepared by the authors: (Perkal, 1953); (Hellwig, 1968); (Hwang & Yoon, 1981); (Kukuła, 2000).

At the second stage of the analysis, from among the prepared rankings (and thus the used methods), we selected one that was the most similar to the others, namely the one for which is the highest (Kukuła & Luty, 2015, 2017), when:

$$\overline{u}_p := \frac{1}{v-1}\sum\nolimits_{\substack{q=1 \\ p \neq q}}^{v} m_{pq},$$

$$p, q = 1, 2, \ldots, v$$

Where: v – number of rankings:

$$m_{pq} = 1 - \frac{2\sum_{i=1}^{n}|c_{ip} - c_{iq}|}{n^2 - z}$$

(Kukuła, 1989), so that:

c_{ip}, c_{iq} respectively, the position of the *i* object in the ranking with the number *p*, *q*;

$$z = \begin{cases} 0, n \in P \\ 1, n \quad P \end{cases}, \text{ and } P - \text{a set of natural even numbers; } m_{pq} \in [0, 1]$$

The method selected in the manner described above is the basis for preparation and interpretation of the ranking of European Union Member States.

3   Results and Discussion

In the countries of the European Union we are observing dynamic growth of organic farming. Shows it an increase in both the area of organic farming and the number of organic farms. Consumers, especially in highly developed countries, also more often reach for organic products, what shows the increasing percentage of sales of organic products in the sale of food products.

An important determinant of production capabilities and specialisation of organic production is taken into account in the analysis of the average size of organic farms, which in the countries of the EU in 2015. developed at 62.75 ha (Table 1).

Table 1 **Basic characteristics of the adopted diagnostic variables**

Numeric characteristics	Diagnostic variables				
	X_1	X_2	X_3	X_4	X_5
max	433.05	21.30	190.70	8.40	95.18
min	2.73	0.30	0.70	0.10	1.17
average	62.75	7.21	44.08	2.21	24.30
median	45.52	5.75	25.00	1.45	11.68
standard deviation	79.75	5.09	58.06	2.51	26.37

Source: Own calculations on the basis of Eurostat organic farming. Retrieved Jan. 3, 2018, from Eurostat database.

The largest average surface area were recorded in Slovakia (433.05ha), where the number of organic farms is one of the smallest in Europe (Figure 1). The largest share of agricultural land certified organic farms in the agricultural land of the total holdings were reported in Austria, which in this respect, significantly overtook other analyzed countries. Expenditure on organic food are highest in Denmark, Sweden and Luxembourg, where also share of sale of organic products in the sale

of food products in total is very high. In the 1/3 of analyzed countries the percentage of processors of organic products in a group of organic producers exceeds 24.30%, of which the largest is in Luxembourg.

Figure 3 Rankings of countries due to adopted diagnostic variables in 2015
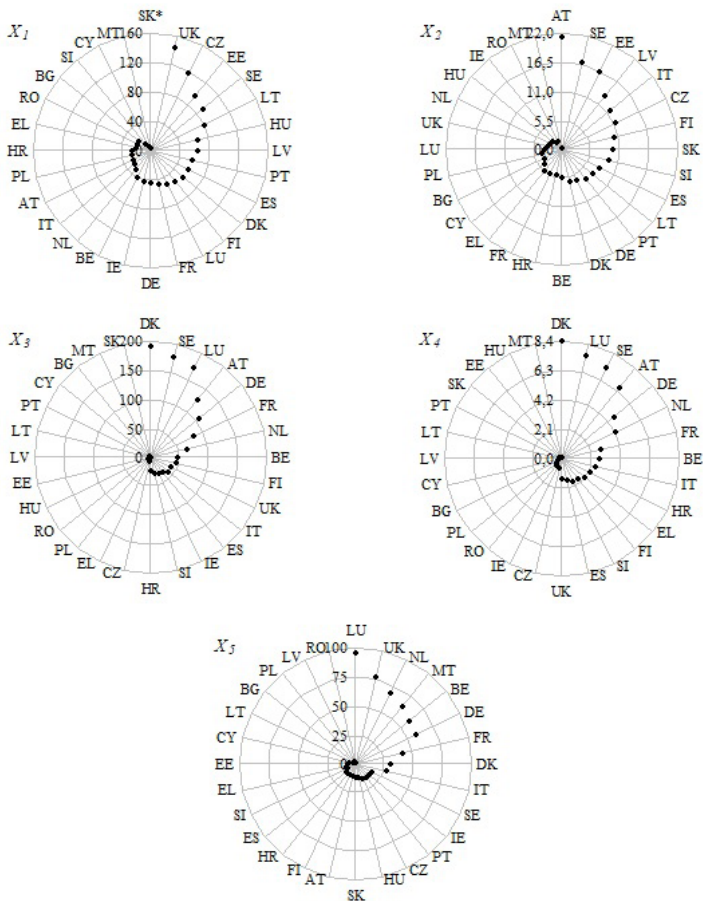
Note: * value for SK is 433.05ha.
Source: Own calculations based on Eurostat organic farming. Retrieved Jan. 3, 2018, from Eurostat database.

The highest value of the presented variables was obtained by Denmark, Sweden, Luxembourg, Austria and Germany, countries in which the

government's environmental policy plays a significant role, and the public interest in healthy food is high. In the case of these countries, the indicators included in the analysis exceeded the average values determined for all countries also reaching in relation to two indicators (X_3- amounts allocated for the purchase of organic food, X_4- percentage of sales of organic products in total sales) the highest values. Slovakia is noteworthy, where the average area of an organic farm is the highest among the countries presented. It was also characterized by a high share of organic farms in the total area of farms. Slovakia is therefore a leader among European countries that joined the EU after 2004. On the other hand, the lowest values of selected indicators were achieved by countries included in the group of developing countries where ecological awareness of society is just developing and legal acts supporting the development of organic farming are introduced. Farmers from countries that joined the EU after 2004 mainly deal with the production of organic products while countries from the old EU are processing these products, what we can observe by analyzing the indicator X_5-percentage of processors among organic producers.

As a result of applying the aforementioned methods, on the basis of the selected set of features, we hierarchised states according to the synthetic measures. The ordinal systems differ significantly. Extreme points in the rankings differ by eleven items. The largest similarity can be seen in a pair of rankings obtained with the use of two ordering methods: MUZ and SSW (m_{pq}=0.95). On the other hand, the largest can be seen in the case of TOPSIS and MUZ (m_{pq}=0.83).

In the concerned problem, the ranking of UE Member States obtained on the basis of the synthetic variable set out using the MUZ method is the closest to all $\bar{m}_p$ the other designated rankings (=0.90).

Figure 3 **Ranking of UE Member States in terms of organic farming in 2015 with the use of the MUZ linear ordering method**
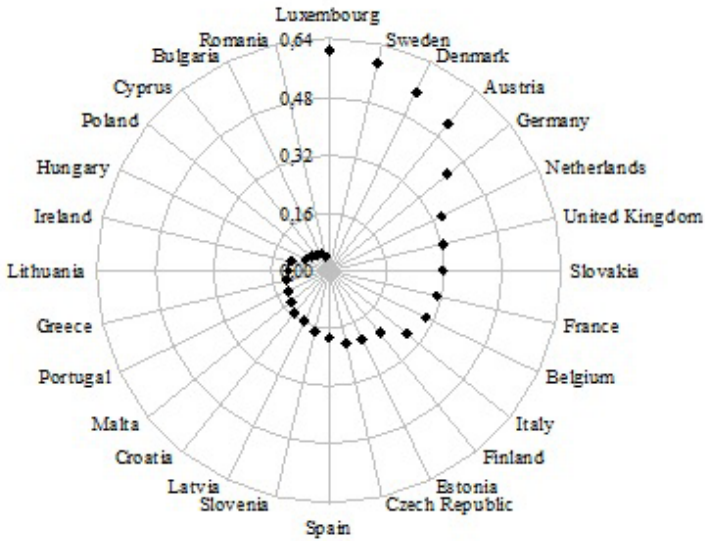
Source: Own calculations on the basis of Eurostat organic farming. Retrieved Jan. 3, 2018, from Eurostat database.

In the ranking prepared using the MUZ linear ordering method (Figure 3), the top place is occupied by Luxembourg, where the percentage of organic producers per the number of farms is the highest. The share of the sale of organic products in the total sale of food products is also relatively high, just like in Denmark (8,4%), Sweden (7,3%) and Austria (6,5%). Additionally, the four countries ranked at the top are characterised by the highest expenses for organic products per capita. The largest consumers of organic food are the Danes (EUR 191), the Swedes (EUR 177), the Luxembourgers (EUR 170), the Austrians (EUR 127), and the Germans (EUR 106). In countries that joined the EU after 2004, the inhabitants spent on the purchase of organic food no more than EUR 5 per year, on average. It is worth paying attention to Slovakia, which occupied a very high position in all rankings (3rd, 1st, 8th, and 5th place) and is the leader among European countries that joined the EU after 2004. Similarly to the Czech Republic, Sweden and the UK, the Slovaks have the greatest average surface area of organic cultivations from among all the analysed countries.

The lowest ranks were occupied mainly by countries classified as developing countries, where the environmental awareness of the society is only now developing, and where legal acts supporting the development of organic agriculture are being introduced. Countries with the lowest level of development of organic production include Romania, Bulgaria, Poland, Hungary, and Cyprus.

4   Conclusion

The development of organic agriculture in EU Member States is affected by many factors, among which emphasis should be put on the legal conditions of the functioning of organic farming at the community and national level, but also on the greater ecological awareness of consumers. Member States not only use the support programmes offered by European institutions, but also need to respect the guidelines concerning environmentally-friendly methods of production. An important role in the creation of this development is played by state institutions of Member States. Their goal should not lay in financial support using the national budget, but also in constant expansion of ecological knowledge, both among producers and consumers, as well as in organisation of cooperation between producers and institutions that distribute and promote organic food.

The level of production of organic food has been increasing both in well-developed as well as in developing countries. Countries that joined the EU after 2004, by increasing the outlays on organic farming, seek opportunities for increasing export possibilities, increasing income, above all, in the case of significantly fragmented farms.

The development of organic farming in EU Member States in 2015 was characterised by a growth in the sales market of organic products and a slightly less dynamic increase in the surface area of organic arable lands.

The share of the surface area of farms growing organic crops in the overall area of arable lands was constantly growing - the average value for the EU Member States in 2015 was 5.8%.

The value of expenses for organic products per capita was also systematically growing, however, it should be noted that it is very diverse in particular EU Member States, and the consumption of these products in countries of the old European Union exceeds thirteen times the expenses for the purchase of healthy food in countries that joined the EU after 2004.

The use of multivariate statistical analysis methods enabled preparation of a ranking of European Union Member States in terms of the development of organic farming. The highest positions in the ranking were occupied by the countries of the old European Union.

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SESSION 2

**SESSION 2.1
FOOD MARKETING AND CONSUMER
STUDIES- SESSION ORGANIZED
WITHIN THE PROJECT VEGA 1/0502/17
"CONSUMER PERSONALITY AND ITS
IMPACT ON EMOTIONAL BEHAVIOUR
AND DECISION MAKING"**

SLOVAK CONSUMERS FROM GENERATION Y AND THEIR SHOPPING BEHAVIOR ON DISCOUNT PORTALS

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Abstract

Shopping in the 21st century is confronted with new trends and challenges. Just like society at large, even the shopping process is subject to the effects of globalized culture and communication, technological progress, use of new information technologies, greater customer awareness and price transparency, fast development of the media, changes in consumer habits, economic development of the society, and particularly the ever-changing world around us. The main aim of this paper is to present the research findings on the Slovak consumers from Generation Y and their online shopping behavior on discount portals. We used a questionnaire as a primary data collection tool. The results show the characteristics of online shopping behavior of the Slovak consumers from Generation Y on the discount portals. They also reflect the online shopping habits of this generational segment in Slovakia and the purchasing preferences in the individual product and service categories.

Keywords: *online shopping, discount portals, product, service, generation Y*

JEL Classification: *M31, M37, M39*

1   Introduction

Success in today's highly competitive environment is determined by the vendors' ability to understand the customer and their needs and desires at the right place and time. According to Higham (2010), consumers have incredible power because their behavior has an enormous impact not only on business, but also

society. This is true both for the entertainment and food industry. It does not matter what country or segment the company is active in, the customer attitudes and behavior are of an utmost importance to it. The consumers drive consumption and purchasing behavior. They are the basis of trade as such, because if there's nobody to buy, it does not make any sense to sell.

The current changes in consumer behavior are a result of technological progress, changing society and, last but not least, market saturation with advertising. A solid understanding of consumer shopping behavior is the basis for a successful marketing strategy and correct orientation on the market. In the current consumer-oriented time is not enough to manufacture products and provide services – it is necessary to focus on the consumer. Some of the following questions are becoming ever more pressing: What is the consumer expecting? Why is he/she making the purchase? Where? When? At what price? (Kita et al., 2010). It is therefore necessary to know the consumer and learn as much as possible about their purchasing behavior.

1.1 Online purchasing behavior

The theory of shopping behavior understands the consumer as someone who identifies their needs and wishes, makes purchases and uses the product during the consumption process. It also stresses the importance of the "buyer" who merely buys the product but does not actually consume it, and the "initiator" of a purchase who provides the recommendations and effectively affects the purchasing decision (Nagyová&Tonkovičová, 2004).

Shopping behavior is a plane of human behavior, which includes reasons for the consumption of goods and use of services, and also the ways in which consumers make the purchases, including the factors that affect this process (Koudelka, 2006;Koprda 2015;Šramová, 2015). It is a process in which the individuals or groups select, purchase, use and evaluate products or services to satisfy their needs (Vysekalová, 2012;Polakevičová, 2015;Světlík, 2016), and also how they behave after the purchase (Kardes&Cronley&Clinet, 2008). Kita et al. (2010) views the shopping expressions as an integral part of consumer behavior, which may be understood in a narrower and broader sense. In the narrower sense, it constitutes the manifested and observable acts, such as the purchase and consumption, which represent important aspects of the decision-making process. In the broader sense, purchasing behavior is understood as a mental and social processes prior, during and after the actual purchase.

The Internet has significantly influenced the development in the world over the last thirty years (Nagyová et al. 2014), and is now regarded as the main communication channel – an information medium, which triggered massive changes

in the area of trade, marketing and communication. It is a huge public array of computer networks, which allows the users from all over the world to communicate and access vast repositories of information (Kotler& Burton &Deans & Brown &Amstrong, 2012). Thanks to the Internet, all companies can market their products and services to new and very distant markets (Kubicová&Kádeková, 2017). One of its key advantages is that it "can transmit all available media formats – text, images, sounds and videos, and thus draw the viewer's attention and, what is more, at a relatively low cost" (Nagyová et al. 2014, p. 256)

The Internet is the most important element in the development of the so-called new economy because the information and communication technologies are becoming key to better prosperity and competitive advantage (Henneyová, 2005, Polakevičová&Szabová&Kamenská, 2014). If the companies fully and effectively harness its opportunities and potential, they can save a lot of money and time in the marketing activities (Nováková&Tomanková, 2010; Košičiarová&Nagyová&Kádeková&Holienčinová&Rybanská, 2017). From this perspective, the Internet has not only become a strong tool for each firm operating on the online market, but it also works as an essential tool for the government institutions, interest groups and individuals.

In online shopping, the whole transaction takes place via the Internet. The customer chooses the goods on the vendor's server where the goods are subsequently bought and paid for in a way that that all three phases – selection, purchase and payment – usually take place without a direct interaction with the vendor (Stuchlík&Dvořáček, 2000). Online shopping experience has been shaping the shopping behavior of consumers in general. Leveraging other studies and resources (Jobber & Chadwick, 2012;Kotler& Burton &Deans & Brown &Amstrong, 2012), we have summarized the following most important stimuli that motivate customers to shop on-line:

- Lower prices
- Wider and better choice of goods and services in comparison with stone shops
- Information social influence
- Creation of online communities
- Comfort, convenience and privacy
- Unlimited working hours (the opening hours are not fixed and the goods are-available 24/7)
- Delivery to the intended destination
- Shopping "without borders"
- Innovations in online sales thanks to group buys or daily discounts
- Use of the so-called "m-commerce"

2   Data and methodology

The aim of the present research was to identify the characteristics of online shopping behavior of Slovak consumers from Generation Y on discount portals. We mapped the online shopping habits of this generational segment in Slovakia and we focused on the purchasing preferences in the individual product and service categories.

To collect the necessary information and data, we used the exploration method and questionnaires, which is based on data collection through subjective responses of the respondents (Bačík & Fedorko & Fedorko, 2011). The questionnaire contained open-ended and multiple-choice questions. In general, its importance is in the following four areas: it provides information from the respondents, establishes the structure of the interview, sets a uniform format for recording the data and makes their processing easier (Kozel et al., 2006). The questionnaire in our research was created and/or distributed solely via the Internet.

The research implementation was preceded by the definition of the following hypotheses:

Hypothesis 1: We assume that more than half of the respondents in the Generation Y research file has had some experience with online shopping on discount portals.

This hypothesis was established on the basis of the research results presented by Media Research Slovakia (2013), which showed that a great majority of Slovak Internet users, i.e. 85% of respondents, has experience with online shopping. Other SAEC results in cooperation with Media Research Slovakia (2013) show that up to 96% of Internet users have experience with on-line shopping. This assumption can also be derived from the 28% yearly increase in turnover of the discount portals, which indicates the number of respondents who have experience with shopping on discount portals (zlavy.sme.sk, 2014) is increasing. According to the findings of the study on Generation Y shopping habits conducted by Cisco (2012), online shopping represents a modern trend for nine out of ten members of this generation, and they actively use it.

Hypothesis 2: We assume that the respondents in the research file make more purchases on the discount portals in the Travel and Eating category than in the Products category.

This claim was derived from the existing surveys (TNS, 2013; Petit Press, a.s. 2013, Bulanda&Lincényi&Kamenská, 2017), according to which customers use the discount portals more and more to make purchases of cheap stays, be it in Slovakia or abroad in European metropolitan areas. Within the Eating category, more than a thousand sushi sets, pizzas and tons of ribs (Poláš, 2014) were sold

in 2014, which can be considered one of the indicators that the discounts in the Eating category are one of the most preferred types of discounts on the discount portals.

3   Results

The research file consisted of 331 respondents from Generation Y. Its terms of gender distribution, the file consisted of 70% women (N=232) and 30% men (N=99).

Table 1 **Respondent experience with online shopping on discount portals**

Do you have experience with online shopping on discount portals?	Men	Women	Total	Count (in %)
Yes	78	187	265	80,1
No, but I'm considering such purchases	10	29	39	11,8
No, and I'm not planning such purchases in the near future	11	16	27	8,2
Total	99	232	331	100

Source: Own data processed from the questionnaire.

From the total number of respondents (N=331), N=265 respondents have some experience with online shopping on discount portals (**Table 1**). This question in the questionnaire was selective in nature. The respondents who had some experience with online shopping on discount portals continued with the questionnaire but those who did not had to opt out of the second part of the questionnaire aimed at the Generation Y shopping behavior on the web portals. A total of 265 out of 331 respondents continued in the questionnaire.

Chart 1 **Shopping frequency on discount portals**
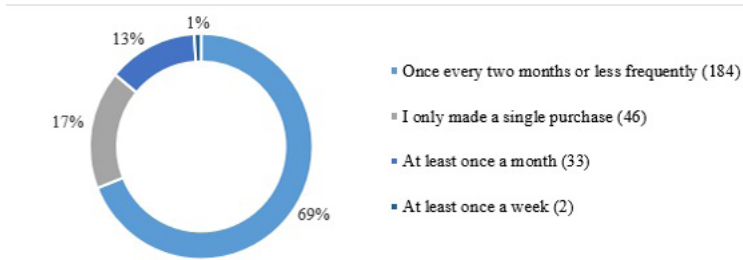
Source: Own data processed from the questionnaire.

The next question in the questionnaire was aimed at online purchasing behavior of the respondents (N=265) and its relation to the frequency of purchases on the discount portals (Chart 1). The most frequent use of the discount portals was once in every two months or less, as signaled by 69% (N=184) of respondents. Up to 17% (N=46) of the respondents said that they made a purchase on the discount portals only once. Another 13% (N=33) made a purchase at least once a month and only 1% (N=2) of the respondents said that used the discount portals very frequently – at least once a week.

Chart 2 **Shopping orientation on the discount portals from the perspective of the end user**
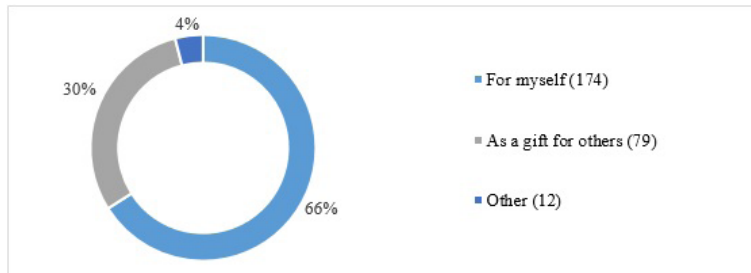
Source: Own data processed from the questionnaire.

The next question surveyed the online purchases on the discount portals from the perspective of the recipient, i.e. the end user the purchase is made for (Chart 2). The most common option was a purchase for oneself, which was marked by 66% (N=174) of the respondents. 30% (N=79) of the respondents said that they use the discount portals to make purchases for their close persons. The remaining 4%

(N=12) marked "Other", which most likely means that they mixed the purchase option for themselves and others.

Chart 3 **Shopping categories on the discount portals**
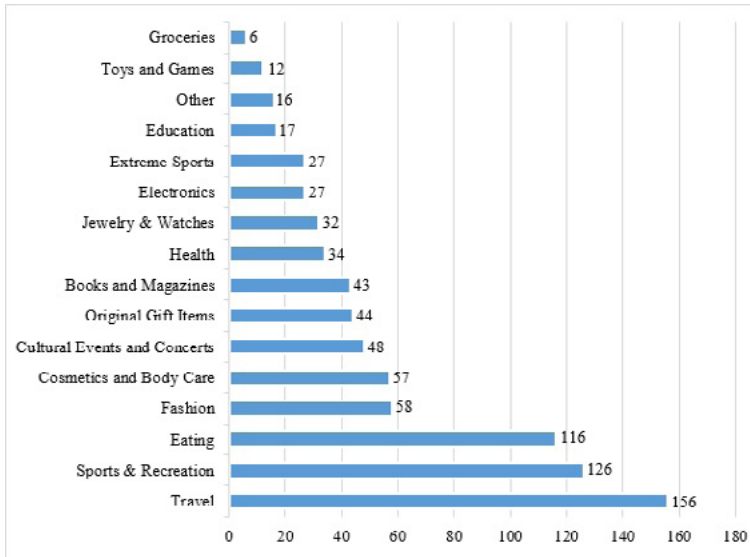
Source: Own data processed from the questionnaire.

In the next section of the questionnaire, we focused on the most frequent categories of products and services purchased on the discount portals (**Chart 3**). The three most frequent categories were products and services from the Travel category (N=156), Sports & Recreation category (N=126) and Eating category (N=116).

Chart 4 **Reasons driving the purchases on discount portals**
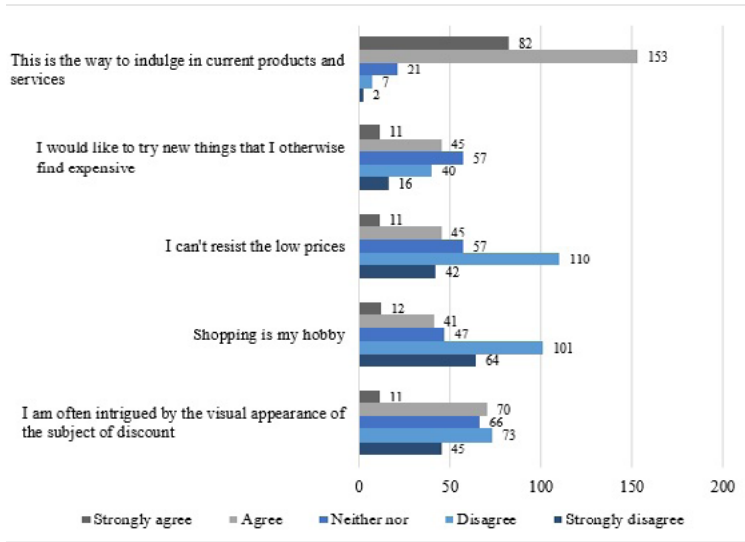
Source: Own data processed from the questionnaire.

The question concerning the reasons for online shopping on the discount portals was enriched by a scaling technique, which gives the respondents an opportunity to agree/disagree with a specific statement (**Chart 4**). The two most frequent reasons for shopping on the discount portals were the perception that the discount portals provide products and services at lower prices (N=153) and that the respondents want to try new items which are normally more expensive (N=105). The least frequent reasons for using online discount portals included the irresistibility of low prices (N=110) and shopping being a hobby (N=101).

Table 2 **Reasons driving the purchases on discount portals (arithmetic average)**

This is the way to indulge in current products and services	4,155
I would like to try new things that I otherwise find expensive	3,479
I can't resist the low prices	2,521
Shopping is my hobby	2,381
I am often intrigued by the visual appearance of the subject of discount	2,732

Source: Own data processed from the questionnaire.

Apart from the percentage (ratio), the individual positions of the respondents were also expressed through an arithmetic average (**Table 2**). Each item has been given a score (1 – Strongly disagree, 2 – Disagree, 3 – Neither nor, 4 – Agree, 5 – Strongly agree). A value approaching 1 means the option is least representative. Conversely, a value close to 5 means the option is most representative. The most frequent answer, i.e. the discount portals are a way to buy current products and services cheaper, has also become the most representative one.

Chart 5 **Criteria affecting the respondents in the selection of discount portals**
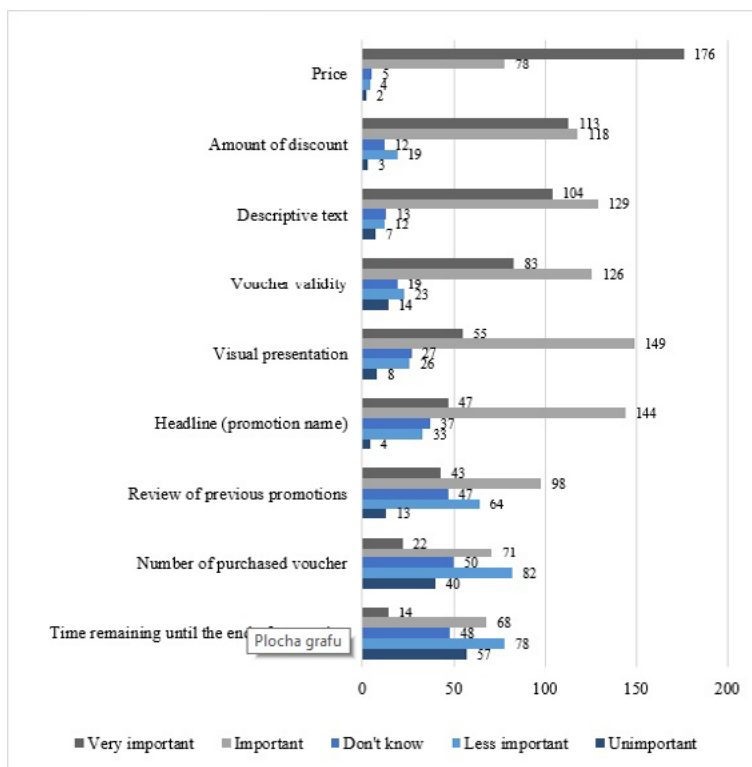
Source: Own data processed from the questionnaire.

Subsequently, we had a closer look at the criteria with an impact on the respondents and their choice of discount portals (Chart 5). The three most frequent answers were the price (N=176), visual layout (N=149) and the main theme or promotion title (N=144).

Table 3 **Criteria affecting the respondents in the selection of discount portals (arithmetic average)**

Price	4,592
Amount of discount	4,204
Descriptive text	4,174
Voucher validity	3,909
Visual presentation	3,819
Headline (promotion name)	3,743
Review of previous promotions	3,355
Number of purchased voucher	2,823
Time remaining until the end of promotion	2,638

Source: Own data processed from the questionnaire.

Even in this case, we complemented the results with arithmetic averaging (**Table 3**). Yet again, we assigned values (1 – Unimportant, 2 – Less important, 3 – Don't know, 4 – Important, 5 – Very important) to individual statements. The price criterion was confirmed to be the most important one.

Chart 6 **Changes and improvements the consumers would make on the discount portals**
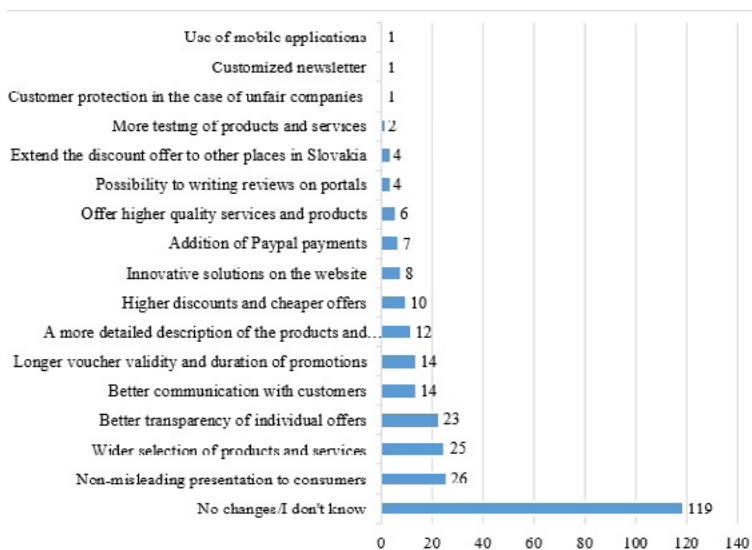
Source: Own data processed from the questionnaire.

In the end of the survey, we asked the respondents an open question to present their own proposals for changes or improvements on the discount portals (**Chart 6**). Given the fact that the respondents were free to present more than one proposal, the number of responses was higher than the number of respondents. We collected 277 different improvement proposals divided into 17 categories. Due to the limited space in this partial presentation of research results we will limit ourselves only to the most frequent answers. Most respondents (N=119) indicated that they do not require any changes, or that they do not know what changes would be welcome on the discount portals. The most frequent answer (N=26) was that the discount portals should not mislead the consumers with false information, obscure labeling and misleading promotional photographs. It was followed closely by the proposal to extend the offering of the discount portals (N=25) and improve the browsability and filtering of the discount portals (N=23).

4   Discussion and conclusion

Based on the data collected, we can verify our hypotheses. Hypothesis 1 has been confirmed since more than half of the research file, i.e. 80.1%, responded that they had some experience with purchases on the discount portals.

Hypothesis 2 has been confirmed only partially because although the results indicate that the respondents prefer purchasing discounts in the Services category to Products category, the most frequently represented categories were Travel (58.87%) and Sports and Recreation (47.55%). We assumed in our hypothesis that the purchases in the Eating category would rank second, but they ended up third (43.77%).

The results from the current research could be applied in the subsequent attempts to analyze Generation Y and its online shopping habits and behavior. They can be beneficial to the marketers, i.e. creators of the campaigns or strategists who determine the ways to address and reach out to the individual customer segments through discount portals. Although the process is primarily shopping-oriented, the discount portals also promote the brands they offer at lower prices. The research findings also pointed to a number of options to increase the popularity of discount portals:

- Correct selection of products and services.
- Focus on the target groups that use online shopping.
- Publication of the offer at the right time.
- Adequate and non-misleading images and texts in the discount menus.
- Consumer satisfaction.

The present research can be extended in the future with the aim to collect more comprehensive findings on the Generation Y shopping behavior on the discount portals through the use of qualitative methods.

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ELECTRONIC WORD-OF-MOUTH: DETERMINANTS OF SELECTION OF ONLINE REVIEWS BY SLOVAK CONSUMERS

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Abstract

Because of its variety and interactivity, Web 2.0 has significantly changed user habits and interests and has brought new factors into consumer decision-making and behavior. It has recently been largely influenced by User Generated Content pages, through which a new electronic form of WOM is developing and expanding. The fact that it is used and trusted by a large number of Slovak consumers was also confirmed by the realized survey (67.1% of respondents). As the number of reviews increases greatly, the user is obliged to select from their countless amount. The submitted work answers the following question: by which criteria the consumer choses reviews in which he has confidence. In our work we distinguish the determinants that relate to the author of the review and the determinants which relate to the text. By using the questionnaire we find that among the auctorial factors, the credibility and expertise in the greatest extent affects the perception of the user reviews. From the text factors it is the text division and argumentation. The influence of the tie strength on the selection of the reviews was in case of our respondents negligible.

Keywords: *Consumer Purchase Decision, eWOM, Electronic Word of Mouth, User Generated Content*

JEL Classification: *D 91, M 31*

1   Introduction

Consumer decision-making has recently been greatly influenced by User Generated Content pages. The commercial form of advertising and family recommendations are not the only known sources of information about products or services. What used to be recently valid: „consumers have learned to rely on advertising and its forms with respect for information that could be used in their purchase decisions" (Kretter & Kádeková, 2011, p. 71), nowadays the consumers are losing their trust in paid advertisement and they prefer more the WOM. Due to the interactivity and variety of Web 2.0, the WOM assumed the new electronical form.

From the moment the web ceased to be a static text, but became an open communication space, and the user was pulled into the creation of its content, useful pages were gained with User Generated Content (UGC). The boundaries between the terms *user - semiprofessional - professional* have spread on the web. Unlike oral dissemination of information, e-WOM in its mostly written form is characterized by the absence of social ties between communicators, a faster rate of spreading the information, as well as a higher number of potential addressees. By contrast to WOM, e-WOM is a public indirect and, in many cases, anonymous communication, resulting in a significantly higher amount of information. These are available to the user at any time in any location.

E-WOM plays an increasingly important role for consumers, has changed work for the marketer, but also for many reviewers. For the consumer it gives access to the current, ideally non-distorted and unmarked information by commercial advertising, the number of which is constantly growing. Many e-WOM marketers have begun to deal with web monitoring. They have gained new space for authentic feedback from the customer, and have begun to respond promptly, especially in the case of negative reviews. For authors who engage intensively with e-WOM - whether through review portals, on their own blog pages or as youtubers - and are perceived as influencers, the internet becomes a place of self-fulfillment, visibility, and potential financial income. There is also a desire to help and be useful, the desire to share the joy of good bargains, to warn of negative experiences, but it can be assumed that these motivational factors are more typical for occasional contributors.

When dealing with e-WOM through the prism of marketing we will discover its great advertising potential. In the survey of 2017 (Statista, 2017), the respondents selected from 19 answers to the question: In which of these forms of advertising do you trust? Up to 55 per cent of respondents said they believed in Internet consumer ratings, making e-WOM the third most credible. In the first place, there were recommendations from relatives, i.e. the traditional WOM, with

78 percent. E-WOM influences the consumer's decision to buy the product or service in any area, but according to Hinterholz & Jooss (2013) it is crucial especially in the context of tourism. Before the actual purchase, most customers read mainly hotel ratings. As the number of user reviews on the Internet is growing every day, the consumer has to select them. The question of what criteria is being done is dealt with in the submitted work.

1.1 Theoretical background

The fact of how much a user review affects the consumer himself and how he perceives it depends on a number of factors. A significant part of them concerns the author of the review as a source of information. Their definition is based on models applied to the traditional WOM, such as the **Source-Credibility-Model** (Hovland, Janis & Kelley, 1953), which focuses on the credibility of the author, which is reflected in the objectivity and sincerity and the author's expertise. Furthermore, it is a **Source-Attractiveness-Model** according to McGuire (1985), which extends the perception of the originator of information about another aspect: its attractiveness according to him resides in mutual similarity with the recipient of the information. The synthesis of both models is found in Ohanian (1990), which understands all three determinants - trustworthiness, expertise and attractiveness – as important when defining the basic characteristics of the mind-forming reviews.

Considering that the consumer does not explicitly focus on the author himself but also effects social influences such as the view of the environment and the effort to engage him, some e-WOM credibility studies also rely on a psychological study of social influences on individual decision-making by Deutsch and Gerrard from 1955. They include Lis` research (2013), which understands the assessment of other users' reviews as a normative social impact on the perception of an internet review. This aggregate rating affects the consumer before he can read the review, and as he tends to be inclined to majority opinion, he will be less critically accountable to the highly rated review.

In addition to the aggregate rating, Lis also examines the factors relating to the author (expertise, trustworthiness, social homophily) and identifies them as information determinants. We also deal with these factors in the presented work, we extend them by adding the fourth determinant - the tie strength - and we consider them as auctorial determinants.

Auctorial determinants are directly related to the reviewer as to the source of information, his/her competence to express himself/herself about the product, and the perception of his/her credibility. Besides this, the interpersonal dimension of communication belongs to this category. The recipient of the information

often perceives the relationship between him and the sender of the information indirectly, only at a subconscious level, yet this session has a significant impact on the reception of the communication. From this assumption we also postulate the hypotheses of our research, by contrasting the perceived perception of the reviewer as an expert and perceiving his similarity with the consumer. In particular, we examine the following determinants within the auctorial level:

Expertise of the author is considered as a basic prerequisite for the ability to formulate valid claims, to evaluate the quality and properties of the products. In the literature, it is therefore perceived as a central factor in the impact of user review on the recipient. Traditional WOM research (Gilly, Graham & Wolfinbarger, 1998) has shown that Word-of-Mouth spread by experts will have a greater impact on consumer decision-making. This is certainly true in many areas, in the assessment of electronics or cars. Further expert studies (Bansal & Voyer, 2000) confirmed this finding also in the area of services. The presented work deals with the perception of user internet reviews from the tourism sector. We can argue with this belief in the area of tourism. For this reason, our research also focuses on the important role the consumers attribute to author's expertise in choosing holidays.

It should be added that we do not usually find any direct data about the reviewer's competencies. However, the consumer may perceive implicit information in the text about his or her vocation, education, experience, or time horizon in which he tested the product.

The image of **trustworthiness** as the second auctorial determinant is created by several factors. First of all, it is the simplicity, validity and authenticity of the testimony, and also the credibility of the author's social status, his intentions. Publishing your own photo will also give you the impression of honesty. This determinant directly points to the authenticity and objectivity of the review, which is one of the main priorities of review platforms. They are therefore introducing different ranking systems.

Another determinant is the analogy between the reviewer and the consumer. In professional literature (Miller & Hope, 1973; McGuire, 1985) this analogy is referred to as **social homophily**. The reciprocal similarity between the sender and the recipient of the information may lie in a similar age, gender, education, and social status. The relevance of this aspect is documented in a number of sources: "Different studies confirm that the effect of the message on the recipient is greater when he perceives the communicator as similar to the recipient (see Brown / Reingen, 1987, Price et al., 1989; Gilly et al., 1998 Wangenheim / Bayon, 2004). As a consequence of the perceived greater similarity, the recipient, among other things, feels more socially attractive and confident [...]. That is why customers in

the review text look for values and experiences that match their own character and ideas. When the review contains such information and the reader perceives them as analogous to its demographics and ideas, it leads to a greater effect of review. "(Wiedmann, Langner & Friedlandt, 2011, p. 5) The relevance of the similarity of the range of values, is particularly evident in e-WOM. In online user reviews, we often do not find the demographic data about the author, which was the basis of social homophily in the traditional WOM. Therefore, the consumer perceives between the lines the implicit information regarding author's preferences, values, and attitudes.

The last but equally relevant determinant at the auctorial level is the **tie strength** between the author of the information and the addressee. This relational aspect is based on the interpersonal nature of e-WOM. Strong bonding intensifies the impact of information acquired on the consumer's behavior and is typical for traditional WOM in the family and among friends. Poor linking increases the flow of information and is characteristic of WOM in the Internet environment.

According to Wiedmann, Langer, and Friedland (2011), we define a second category of determinants that form the reception of reviews, namely **textual determinants**. These determinants are especially important because, e-WOM, unlike classic WOM, is in most cases carried out in a written form. Therefore, the text can be perceived more thoroughly with all its nuances.

To the textual determinants we link:
- **simplicity** - at the level of the sentence construction, but also in the choice of words, it contributes to the clarity of the text,
- **text division** - in the optimal case, the text is characterized by the logical continuity of information, which is also reflected in the external text structure,
- **conciseness** - we perceive the text as terse in a reasonable length with a reasonable amount of information,
- **stimulation** - is manifested for example, in the form of rhetoric questions, using examples,
- **visual appearance** - when selecting from a large number of reviews, the consumer also considers micro typographical elements (font size, line spacing, etc.) and macro typographical elements (punctuation marks, capitalization, etc.),
- **language** - as a distinctive feature that greatly contributes to the uniqueness of the review, the author's own style affects the reader emotionally and contributes to the creation of lively imagination, linguistic correctness is also noteworthy, reviews with grammatical errors create bad impression for the consumer,

- **argumentation** - The listing of relevant arguments does not only increase the usefulness of the review but also its credibility, especially in the case of bilateral argumentation which describes both the beneficial properties of the product and the deficiencies,
- **informativeness** - the value of the review is directly proportional to the amount and details of the information,
- **novelty** - thanks to this feature, eWOM can make a significant contribution to the recipient, especially if the information provided meets two aspects: novelty and uniqueness,
- **usefulness** - as a key factor in evaluating reviews, is based on the assessment of the information obtained and the purchase interest.

The practical part of the presented work is based on the above categorization. It focuses on the realization of a survey of relevant factors influencing the perception of user reviews by Slovak consumers in the field of tourism.

2   Data and methodology

The factors described in the previous part of the thesis formed the basis for the creation of the main research method which was done by a questionnaire. The questionnaire was preceded by the setting of a practical part and the formulation of research questions. The purpose of the survey was to find out which factors influenced the perception of user reviews; to find out what the consumer has selected and on the basis of which he has chosen the selected reviews from an extraordinary amount. As the source we utilized two main categories: auctorial determinants and textual determinants.

To meet the above mentioned goal, we have identified the following research question:

RQ: Which auctorial and textual factors affect the perception of user reviews in the field of tourism most significantly?

Concerning the sample size, it was comprised of 126 respondents aged 19 to 62. For the purpose of our survey, a quantitative method of the questionnaire was selected for data collection. The questionnaire method was particularly suitable because personal contact with each respondent was not necessary and the sufficient amount of data was obtained. This form met the intent of bulk data collection.

To obtain the data, an online questionnaire was used at http://www.kee.fpv.ukf.sk/dotaznik/. Respondents were contacted via e-mail and by two social networks (Facebook, Twitter). Using the online form of the questionnaire helped

to bridge distance and share the questionnaire faster. Respondents filled out an electronic form of the questionnaire anonymously.

The questionnaire consisted of 16 questions that were divided into three sections. The first four questions in the first section served to obtain identification data such as: gender, age, education, Internet experience. In this section, we included the item about holiday planning in which we offered five options, the respondents were then asked to choose only one answer. If they selected the option: searching for information over the Internet, they could continue to the second section.

The second section was comprised of one item, whether they prefer official sites of the travels agencies or UGC. The third section consisted of 14 questions. The first one was a dichotomous choice of answer and it verified whether the respondents were using travel reviews and whether they searched for these reviews on the Internet before choosing a particular hotel / destination. Subsequently, we focused in four other items on all four auctorial determinants. Each determinant was transformed into one of the closed questionnaire items with a simple answer. Subsequent closed items of the third section were focused on textual determinants. For three entries, we used a numerical scale (from 1 to 5) to answer, where one item consisted of a dichotomous selection of answer and 5 items with a simple selection of answer.

3   Results and discussions

From the first section of the questionnaire we found the respondents' gender which represented: 72.2% women and 27.8% men. The age scope ranged from 19 to 62 years.

With regard to completed education, a secondary school with a school-leaving examination was represented by 54.8%, on the second place was university education - the second stage with 28.6%, on the third place – PhD-graduates with 11.1% and on the last place remained the first grade with 5.6%.

96.2% of respondents read reviews before selecting a particular resort. 3.8% of the answers were negative.

We found that respondents considered in 41.5% cases whether the review was authentic and without hidden form of advertising. 32.1% of respondents even lost confidence in the hotel they searched for, and started to look for another object when they felt that the review was not authentic. 26.4% of respondents said they did not think about who was the author of the review. From the above we can state that for 73.6% of respondents the author's expertise was important.

For 71.7% of respondents, it was more important that the reviewer had similar hotel / destination choice criteria while 28.3% chose reviews based on the amount of author´s reviews (figure 1).

Figure 1 **The survey question centered on the social homophily**
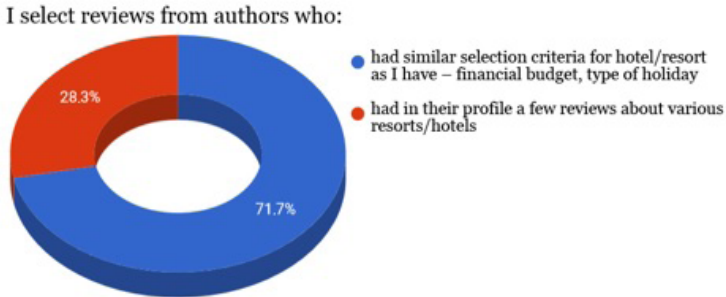
Source: Own processing, 2018.

Trustworthiness as one of the factors of the auctorial dimension was positively evaluated: 62.3% of respondents said they rated the reviewers as honest, 34% of the respondents perceived reviewers as reliable. Only 1.9% of respondents said the authors were perceived as unreliable or embellished the review.

In response to the last question that followed the auctorial dimension, we found that 50.9% of respondents would be able to spend free time with reviewers. 3.8% of respondents could become friends with the authors of the reviews, and 1.9% of the respondents would be able to entrust the secret to the reviewer. We have tracked the tie strength between the author of the information - the reviewer and the addressees. Overall, we can assume that the intensity of the relationship was 56.6% represented in the responses positively.

Each factor of the auctorial dimension was rated more positively by the respondents, making it possible to conclude that auctorial dimension factors played an important role in responding to the selection of hotel / destination reviews.

In the text dimension, we found that 50.9% of respondents did not choose the review with simple words and clearly formulated sentences. This answer confirmed the subsequent question of the questionnaire in which we asked about the simplicity factor. 45.3% of respondents said they preferred shorter reviews, but up to 54.7% of respondents said they preferred detailed reviews (chart 2). It follows that simplicity as a factor did not have such a significant impact on respondents as the amount of information in the review. According to 96.2% of respondents, the

review had to have a clear structure and logically arranged arguments and only then the respondents perceived it positively.

Figure 2 **The Survey question centered on the visual appearance**
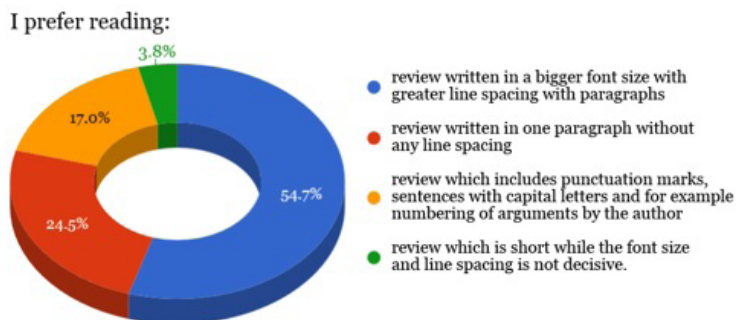
Source: Own processing, 2018.

The largest percentage of respondents in the assessment of the factor argumentation was presented by the respondents in the presence of pro-and-con arguments in the reviews. In 94.3% of respondents, this contradictory representation of arguments plays an important role, which is also necessary in terms of credibility - the author who put forward pro-and-con arguments can be perceived more positively than review with positive arguments. The visual presentation of reviews was significant to respondents. 71.7% of respondents said that reviews that were written with punctuation, sentences starting with capital letters, argument numbers, larger font types, and more line spacing had more positive impact on reviews, such as reviews written, for example, in just one paragraph. A review with a clear text about the necessary facts and rational but interesting information preferred 81.2% of respondents to emotional and unique reviews.

Factor novelty was positively evaluated - 54.7% of the respondents chose the option that the review must be up-to-date. The criterion Date was on the first place. On the second place was the evaluation of reviews from other users. The third place was taken by the number of reviews of the author and the last place belonged to visual preview of the reviews.

The factor usefulness received 86.7% positive responses – i.e. the respondents chose reviews that contained useful information or those information which they have not read yet – they were unique.

The last factor we were monitoring was the stimulation. Respondents were asked whether they perceived positively if the author also posted the current

photo of the resort / hotel in the review. 88.7% of the respondents answered positively.

Through a questionnaire survey on a sample of 126 respondents, we obtained data that offer a response to the research question: Which of the auctorial and textual factors do most significantly affect the perception of user reviews in the tourism industry?

Based on these results we can formulate the following statements:

In the context of auctorial determinants, the trustworthiness affected the perception of user reviews in the greatest extent. In the question that followed this determinant, respondents chose the options that represented a credible author - understood as reliable and honest.

Author's expertise was on the second place - this factor had a particular influence on the choice of reviews among respondents, particularly with regard to the use of hidden advertising in reviews. It is possible to conclude that respondents had experience with hidden advertising and became sensitive to it.

On the third place was the social homophily between reviewer and consumers. Respondents picked reviews from authors of similar age and gender, with similar education and social status, and with a similar choice of holidays. Such a selection process is likely to take place at the subconscious level, leading to a higher degree of identification with the content of the selected e-WOM, as well as to building greater confidence. The tie strength between the sender of information and the recipient was the weakest of all auctorial determinates.

The following five factors can be identified as the five most important factors in the category of textual determinants that mostly affect user perception perceptions:

The text division that is visible in reviews at first glance affected the perception of user reviews from all text factors most. The presentation of shortcomings, as well as positive comments in user reviews, influenced the perception of user reviews. The factor argumentation was more important than the factor stimulation in which we assessed the importance of the photo in a hotel / destination review.

The factor usefulness of the information and its utilization in choosing a hotel / destination influenced the perception of user reviews from the fourth position. The relevance of language performance can be interpreted in such a way that respondents prefer a clearly worded text with the facts that they needed to know about the destination / hotel or rationally formulated text without emotional elements. The rating of all the first five determinants exceeded 50%.

Visual appearance achieved the sixth position when perceiving user reviews within textual factors. Respondents also evaluated the nature of the text - whether it had elements that helped to read reviews (font size, line spacing, etc.). Factors

novelty, simplicity and conciseness have proved to be the least appropriate within the text dimension. Similar results also listed Wiedmann, Langer and Friedlandt (2011), in which the factors of simplicity, text division, and conciseness were also not decisive. Recipients centered their attention on more diverse reviews in their search, namely those which included illustrative examples, a private photo of certain product with a comment, or even a humorous commentary.

We also found out from the results of our survey that only 20% respondents with more than 15 years of experience with the Internet are looking for holiday information through forms other than the Internet. 43% respondents with a 10 to 15-years Internet experience and 50% of respondents with 5-10-year Internet experience search for holiday information elsewhere than via the Internet. Internet experience and trust in websites - or, the ability to distinguish the authenticity of the site from advertising - also reflected in the search for hotel / destination information in the great extent. More experienced respondents with the Internet (great number of years) searched for the information over the Internet more than the less experienced (smaller number of years). More experienced respondents knew how to select sites and focused on authentic review content.

User reviews on the Internet accounted for 62.7% of respondents as a source of information on selected travel destinations. 27% of respondents preferred the traditional WOM - in their oral form - e.g. as a recommendation from family, friends. Based on these results, we can say that the credibility of e-WOM is increasing in the case of Slovak consumers in the field of tourism.

4 Conclusion

The survey did not focus exclusively on the credibility of the user review source and the psychological aspect of selecting user reviews. We investigated the impact of all auctorial and textual factors on the perception of user reviews in the field of tourism. The relevance of both types of factors was confirmed. Respondents were willing to read extensive reviews, but with a good text structure. Ideally, reviews should be as up-to-date as possible with good arguments for and against, and should offer useful advice.

Insignificant influence of tie strength on perception and choice of reviews was an interesting finding. When we compare traditional WOM and e-WOM, in traditional one, the tie strength between the author of information and recipient got stronger by personal contact.

The data obtained in the described research can provide a basis for comparing the results of future surveys in this area. E-WOM will not lose importance in the near future, with a sharp increase in online stores growing in every area, potential

customers will choose products based on recommendations - via the Internet. This fact is especially valid for tourism. This is evidenced by the fact that 67.1% of surveyed consumers said they are collecting information about selected hotels or destinations through these channels when planning their holiday.

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PRIVATE BRAND AND ITS IMPACT ON CONSUMER BEHAVIOUR

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Abstract

All marketing decisions are based on the assumptions and knowledge of consumer´s behaviour. Examining consumer´s decision-making and behaviour is a challenging process, but it is very important for companies and marketers to understand them. For a good understanding of a consumer it is necessary to know consumer´s habits, needs, preferences and ideas in purchasing process. Recently, emphasis has also been put on the use of sensory stimuli for communication between consumers and retail. An important role in consumer decision-making also plays particular product brands. The presented document deals exactly with the issue of the production of brands, concretely the private brand. Under the expression "private brand" we can understand products manufactured for specific retail chains. The practical part of this document is based on a questionnaire survey, and one of its parts is a blind test. Two different products are tested through the blind test, and these ones are from the same manufacturer. Based on primary results, we can claim that 77% of consumers prefer "branded" products. Their behaviour is largely influenced by the brand itself. This trend, however, has a decreasing trend as consumers are becoming more educated in the food market. However, on the basis of sensory properties (taste), the products we studied have almost the same rating.

Keywords: *consumer´s behaviour, consumer, private brand, product, senses*

JEL Classification: *M30, M31, M37, M39*

1   Introduction

1.1   Brand and its impact

Consumers nowadays have different forms of bids for choosing different types of food. Retailers / distributors themselves encourage consumers to make their bids, i.e. they offer their customers various price alternatives they can choose from. If the consumer's effort is to save money, they have an option to buy discount coupons, take advantage of various stocks and priced outfits, search for discounts directly in a store, or focus on goods produced privately (Garretson et al., 2002; Predanocyová et al., 2017).

In 2004, a survey was conducted which showed that consumers are less aware of brand authenticity (Grayson and Martinec, 2004). Since then, many years have passed and interest in the value of the brand has grown diametrically. Over the time consumers have learned how to distinguish between "genuine" and "counterfeit" (Beverland, 2005; Holienčinová, 2013). Even retailers are trying to bring brand value closer to consumers. This phenomenon is realized by the production of private labels. Consumers are therefore offered quality products at reasonable prices (Braakter et al., 2013; Šugrová et al., 2016). The brand value itself depends on how consumers perceive it. The positive perception of the brand influences the loyalty to the brand but also its verbal administration (Morhart et al., 2015; Choi et al., 2014).

The response of consumer´s behaviour is influenced by marketing stimuli, such as: brand, advertising, price, shopping atmosphere and the product itself (Kapsdorferová, 2008; Soars, 2009). The truth is, however, that consumers perceive only the brand itself, its graphic design and packaging rather than price and its composition (Berčík et al., 2016; Kubicová and Kádeková, 2011). In the very decision making process, the price plays the highest role. Lately, higher demands are placed on producers and this fact is most reflected in price sessions (Kadeková et al., 2017; Géci et al., 2017). One of the important tasks in consumer decision-making also plays packaging. It performs not only a protective function but it is also an important marketing tool (Mokrý et al., 2016; Kubicová et al., 2012). According to Kotler and Armstrong (2012) 70% of consumers decide to according make a purchase to product´s packaging. Speaking about the atmosphere at the store, its impact on consumer´s decision-making is enormous (Kubelaková and Košičiarová, 2016). Therefore, the consumer decides which retail store to visit and also what food / products to choose (Palúchová et al., 2016; Zamazalová, 2008).

Brand and composition are two different things. According to Nagy, Babčanová and Košičiarová (2016) it is a brand name, symbol, colour, design and their combination, which distinguishes them from competing products (Nagyová et

al., 2014). Composition provides consumers with objective information about what specific food contains, i.e., from which raw materials it was made (Radighierj, 2014; Holienčinová and Dobák, 2015).

1.2 Consumer and private label

Several consumer market surveys show that consumers are not able to make rational decisions and are also unable to understand their true motives and attitudes throughout which they make purchasing decisions (Géci et al., 2017; Dunning, 2007; Songa and Russo, 2018). The external features of products, such as packaging design, brand, price, content and nutritional information, play a central role in consumer´s buying decisions (Jaeger, 2006; Ubrežiová et al., 2012).

"Consumer´s behaviour" is a term which describes doing of every individual who buys and consumes products and services at the same time. However, this concept does not only include the purchase itself but also the use and selling of products or services (Kozelová, 2011). Nagy, Berčík and Horská (2014) define consumer´s behaviour as a process of behaviour in the market of product and services. The primary objective is therefore to buy, consume and meet consumer's needs. It is also possible to define consumer´s behaviour as a condition where the consumer experiences a disagreement between his/her real and ideal state. In this case, there is an ability to choose from national or private brand products (Mandel et al., 2016).

Private brands are also called trademarks and can be characterized as retail brands that are manufactured by retailers for sale in their stores (Keller, 2017; Poliačiková, 2011). Based on the survey, it has been shown that consumer is able to identify a private brand but cannot attribute it to the right retailer/distributor (Schnittka et al., 2015). Another survey has confirmed that consumers do not consider a private brand as a brand that distinguishes individual retailers, they consider them to be national/private brands (Szymanowski and Gijsbrechts, 2012; Kubelaková et al., 2016).

Private brands appeared at the end of the 19th century in the United States. They reached the European market in the 70s of the 20th century and they entered Slovak market at the end of the 20th century (TNS Slovakia, 2015). Originally, they were designed to cover the cheapest products of the range of products. Once these products were considered to be "ordinary foodstuffs" products, which had not only low resolving power but they were also of. Over time, however, everything has changed and we can now state that these products are of comparable quality and/ or even of higher quality than related products produced under the national brand (Geyskens, 2010).

Based on a survey by TNS Slovakia (2015), it was confirmed that 98% of Slovakia population had bought at least one private branded product in the past. 70% of Slovaks know what the term "private brand" means, and more than 50% of Slovak consumers also buy them regularly.

2   Material and methodology

The survey was conducted by questionnaire survey, which was attended by 160 respondents of young age structure. The data were obtained from respondents in the territory of Slovakia from November to December 2017. The survey was carried out in physical and paper form, the main aim of which was to obtain the relevant number of answers for the questionnaire survey. The questions in the questionnaire were divided into several parts and they also included questions offering an alternative response.

Table 1 **Characteristics of Respondents**

Category of Respondents	Number	%
Male	47	29
Female	113	71
Age Stucture	Number	%
17 – 18 years	18	11
19 – 20 years	45	28
21 – 22 years	28	18
23 – 24 years	47	29
25 years and more	22	14

Source: Results of the research.

The main objective was to find out how respondents perceive private brands and how these brands influence their buying behaviour. The document is aimed on one brand that is compared to a private brand by the same manufacturer. It is held throughout a blind test.

We had stated following assumptions:
- Assumption No. 1: We assume that rural people prefer branded goods to private brands.
- Assumption No. 2: We assume that women most frequent buy salty snacks - crisps.

- Assumption No. 3: We assume that women choose a better sample - number 2, according to their taste.
- Assumption No. 4: We assume that people living in the city choose as the most attractive packaging - number 1.
- Assumption No. 5: We assume that more than 50% of respondents choose the packaging based on its graphic design.

We will confirm or reject the established assumptions by means of the selected statistical method. Pivot tables will be used to verify assumptions. Assumptions will be verified by method of mathematical statistics – Pearson Chi-kvadrat of goodness-to-fit test.

3   Results and discussion

The survey was attended by 160 respondents of young generation. Most of them were women (71%). 95% of the respondents were students. Their highest level of education was high school with leaving exam (43%) and University degree - bachelor (35%). The monthly income of respondents was in a large range (Figure 1). The chart shows that 26% of respondents have no income. This is due to the fact that the survey was mainly focused on young generation. Young people are assumed to be studying, so their income is on zero level. Secondly, monthly income that ranged from 101 € to 200 € (19%) and thirdly the income was up to 100 € (18%). These results were expected as the survey was aimed on young people. Most respondents live in rural areas (53%), others live in the city.

Figure 1 **Monthly income of the respondent**
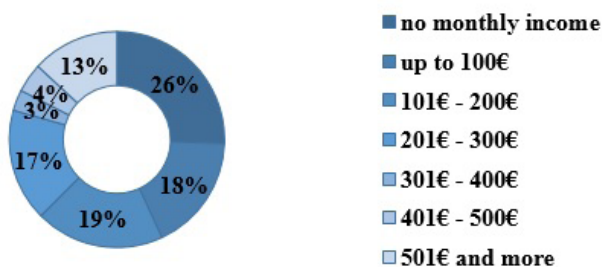
Source: Results of the research.

The survey was aimed on the company DRU (joint-stock company). The document was focused on salty snacks, specifically sticks. DRU also manufactures

sticks under its brand as well as under the brand name of the Coop Jednota retail store. The main objective was to find out how respondents can distinguish these products, throughout a blind test.

At the beginning of the survey we asked whether the respondents buy salty snacks. The vast majority responded positively (96%). This was not surprising at all, because as people buy regular food, they also buy sweets or salty snacks. The interval of buying salty snacks is mostly repeated weekly (44%). 49 respondents (32%) buy salty snacks occasionally. One of the three most common places to buy salty snacks are supermarkets (Figure 2). On the second place were hypermarkets with almost 32% of shares and retail stores ended up last. These shopping places serve all people to buy not just ordinary food. Based on the results, we can say that most respondents buy salty snacks during common food purchases. Only in rare cases are these snacks bought separately, for example: when the respondents go to the cinema or organise some celebration.

Figure 2 **Types of shops**
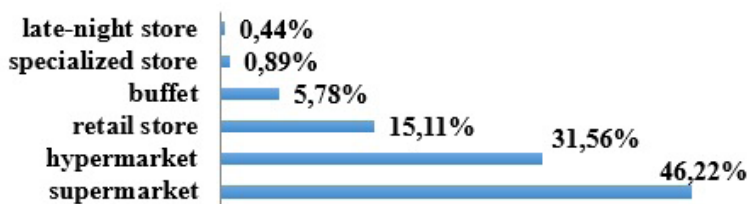
Source: Results of the research.

We also wanted to find out more information about customer´s preferences in choosing salty snacks. Most of them agreed that they make a choice according to their favourite flavour (23%). 19% decided according to the brand. The price, as one of the main attributes in the selection of food, is on the third place. 18% of respondents decided according to the price factor. The price, as one of the major factors of choice, was also confirmed in the "The emotional side of price" survey (O´Neill et al., 2001). 12% of respondents decided according to the size of the package.

Nowadays, consumers have a very wide choice of salty snacks. More than half of respondents opted for crisps (54%), followed by nuts (15%) and puffs (10%). Sticks, on which research was aimed on, were in a general selection of salty snacks on the fifth place (8%).

In relation to this question, a scientific presumption was set, that women most frequently buy salty snacks - crisps. The value in the table (u tab) at the significance level α = 0.05 was 1.828758 and the critical value was at the level 3.841460. On the basis of the above facts, we accept the null hypothesis and we can claim with the probability of 95% that women most frequently buy salty snacks – crisps.

However, the survey was also focused on private brands (Figure 3). We've determined that they prefer branded goods to private retailers' brands.

Figure 3 **Branded goods vs. private brands**
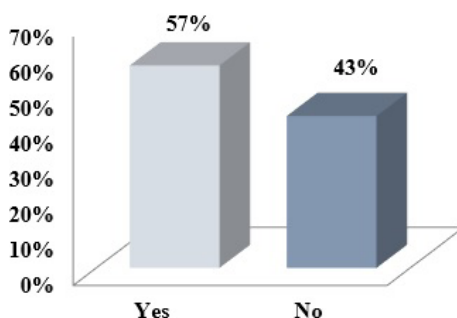
Source: Results of the research.

The graph shows that 57% of the respondents prefer branded goods. This figure is slowly decreasing as respondents start to be aware of the comparable quality of products made under the private brand (Batra & Sinha, 2000). This can also be due to the fact that products made under the private brand are more "friendly" to consumers' wallets. This can also be caused by the fact that consumers have started to read the packaging of individual foods. They came to the conclusion that products under the private brand are manufactured by the same company as the branded goods. Products made under a private brand often have lower price and a comparable quality to branded products.

In relation to this question, a scientific presumption was set, that rural people prefer branded goods to private brands. The value in the table (u tab) at the significance level α = 0.05 was 0 and the critical value was at the level 3.841460. On the basis of the above mentioned facts, we accept the null hypothesis and we can claim with the probability of 95% that rural people prefer branded goods to private brands.

The next step is a scientific experiment, which is the most important part of the questionnaire - blind testing. Two samples of salt sticks were presented to the respondent and their role was to evaluate the design, the smell and the taste. Subsequently, the respondents were shown packages in which sticks were sold and their job was to make them more attractive. They had to explain their decision through the following question. The first sample which the respondents had a chance to evaluate, were the DRU sticks and the second sample was a private brand produced by the Coop Jednota retail chain. Both samples, however, are manufactured by DRU company.

With regard to the chosen test method, the blind test is used to identify the samples submitted, the role of which is to choose the best one. Its role is to minimize the subjective attitude of the respondent (Wadley, 2004).

The first pair of blind test questions concerned one of the basic senses, specifically vision. With their eyes, the respondents rated the overall appearance of the sticks (Figure 4) and also evaluated the amount of salt on the stick (Figure 5).

Figure 4 **The appearance of salt sticks**Figure 5 **Salt on the stick**

■ Sample No. 1 (DRU)
■ Sample No. 2 (Coop Jednota)
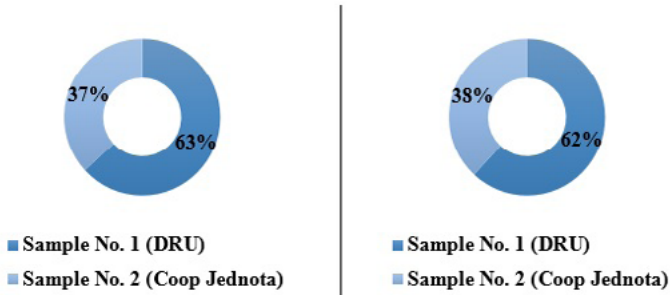
Source: Results of the research. *Source*: Results of the research.

As shown in Figure 4, 101 respondents (63%) selected the DRU brand as better product according to its colour. While the Coop Jednota brand sticks were chosen by only 59 respondents (37%). The following chart (Figure 5) was aimed on the amount of salt on the stick. In this case, sticks by DRU company was chosen by 99 respondents (62%). Salted snacks from Coop Jednota were chosen by 61 respondents (38%).

We also focused on a sense perception throughout a blind test. The task was to make respondents to decide which of the samples they would choose according to their preferences. they had to make a choice by using their olfactory organ. As we can see from Figure 6, most of the respondents have chosen the salty DRU brand.

Figure 6 **The aroma of salt sticks**
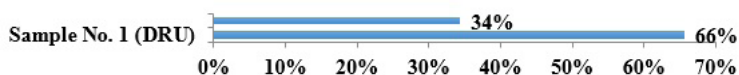
Source: Results of the research.

The final question of the blind test was focused on the taste of sticks. In this sensory qualification, the values of both samples are very close. As shown in Figure 7, 89 respondents (56%) chose DRU sticks and 44% of respondents chose Coop Jednota sticks.

Figure 7 **Taste of salty sticks**
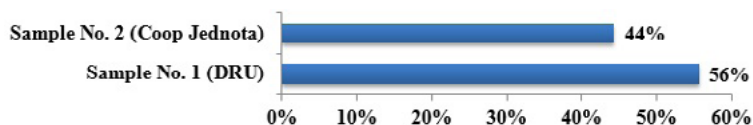
Source: Results of the research.

In relation to this question, a scientific presumption was set, that women have chosen better sample - number 2 according to their taste. The value in the table (u tab) at the significance level α = 0.05 was 0 and the critical value was at the level 3.841460. On the basis of the above mentioned facts, we accept the null hypothesis and we can claim with the probability of 95% that women have chosen better sample - number 2 according to their taste.

For the basic comparison to find out what impact has got customer´s decision on a brand, we decided to create a graph (Figure 8). Comparing Figure 7 and Figure 8, we conclude that young consumers´ behaviour is irrational. Most consumers still prefer branded goods to private brand products. This can be caused by mistrust towards private brands.

Figure 8 **Which would you prefer to buy?**
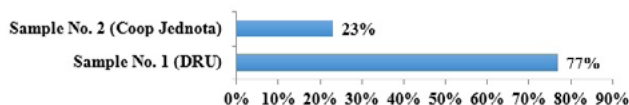
Source: Results of the research.

Finally, we have dealt with the graphic design of packages in which salty sticks are sold. This question was followed after the blind test, as it could influence

individual respondents. A larger number of respondents decided that DRU sticks have got more attractive packaging (89%). Only 11% of respondents voted for packaging of COOP JEDNOTA sticks. Decisions were made according to the graphical design of packaging (54%); this fact was also confirmed by the research held by Mueller and Szolnoki. The second group decided on the basis of the brand of salty snacks (37%) and the color of the individual packages (20%) was the last factor.

In relation to this question, a scientific presumption was set, that people who live in the city have chosen as the most attractive packaging - number 1. The value in the table (u tab) at the significance level α = 0.05 was 7.747615 and the critical value was at the level 3.841460. On the basis of the above facts, we accept the alternative hypothesis and we can claim with the probability of 95% that people who live in the city would not have chosen as the most attractive packaging - number 1. At the beginning we assumed that more than 50% of respondents will choose the packaging based on its graphic design. This assumption was confirmed by research.

4   Conclusion

As mentioned earlier, the main objective of the document was to find out how consumers perceive private brands. The perception of private or classic brands is now more or less at the same level. Consumers have knowledge about them, but this knowledge is not satisfactory enough to buy private brands of retail stores. The survey found out that 57% of respondents still prefer branded products to private brands. Among the factors that affect the customers, whether they buy some product or not, includes not only the brand (19%), the packaging (12%) but also the price (18%), which in most cases is the decisive factor. The intention was also to find out whether consumers consider the origin of the food in question and whether it affects the placement of products on the shop shelf. Up to 61% of respondents said that they did not notice the country of origin when doing the shopping. But 27% of respondents said they notice the country of origin, but they do not really care about the origin that much. Regarding the impact of product placement on racks, 86% of respondents agreed that their placement on shop shelves does not influence them and they buy food they know and also according to its taste. The survey also confirmed irrational behaviour when it comes to buying branded goods. Most respondents prefer branded goods to private brands.

Based on the above mentioned, we would therefore encourage consumers to read the packaging in which the food is packed. We also encourage retailers to get their private brands to come to foreground, for example: free samples or

comparative tasting. Consumers are very wise, they have the opportunity to get a lot of information, but they need to use not only in the theoretical but also mainly practical level in their life.

Acknowledgments

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CONSUMERS' AWARENESS OF THE TERM SUSTAINABLE CONSUMPTION

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Abstract

In this publication the authors focused on consumers' perspective. The aim of the article is to define consumers' awareness and knowledge of the term of the sustainable consumption. The awareness of that term is a necessary condition for changes of consumers' behaviours and consumption model. The publication was prepared on the basis of primary materials from the questionnaire survey conducted via direct interview technique in 2017. Respondents were selected by quota and purposive sampling method. Structure of the sample corresponded with the structure of Wielkopolska citizens in terms of age and sex. There were total 433 interviews conducted. Consumers have limited knowledge of the sustainable consumption concept. Most of the respondents came across terms related to the concept of sustainable consumption, but it was difficult for them to identify these links. Fewer than half of the respondents were able to interpret sustainable consumption on their own. However, it is worth to add that the range of behaviours declared by the respondents proves that they correctly identify this concept. Respondents referred mainly to the reduction of food intake, the optimization of household food supply and the reduction of food waste. Less frequently, they have addressed topics related to the positive impact on the environment, which may be an indirect effect of the indicated behaviours.

Keywords: *sustainable consumption, food products, trends, awareness, consumers*

JEL Classification: *E21, D12, D83, Q01*

1   Introduction

Over the centuries the demography, diets, demand structure, fashion, traditions, time and family budget management methods have changed. The pace of changes taking place in the world has an impact on individuals' (micro scale) as well as social groups' (macro scale) way of life. The changes of societies and economic systems indicate that past things not necessarily have to end however they undergo changes.

Under changing economic conditions a change of values is one of the drivers of consumption development. Due to overvaluing of ways of thinking about satisfying needs (consumption), the term "consumption" evolves (Seyfang, 2004, Kiełczewski, 2008). In the scientific circles there are discussions over the definition of consumption. In the contemporary world the consumption is becoming something more than buying, using, eating or possessing. The consumption is becoming the way of creating an own identity and it builds foundations for further development (Figiel, 2004, Comim, Tsutsumi & Varea, 2007). When referring to creating consumers' own identity in the age of globalization, Mróz (2013) indicates "the redefinition of traditional connotations assigned to the consumption" (p. 106) and at the same time emphasizes the fact that for a small number of consumers, the consumption is a method of communicating their separateness and uniqueness to their environment, in the world where unification processes are taking place. A mundane act of consumption is becoming an opportunity to demonstrate the value system, views and attitudes as well as to emphasise the independence. These elements are reflected in consumers' contemporary behaviours characterised by individuality, novelty, excitement, experience, renaissance of consumers' virtues, digital abstinence, co-sharing, cooperation, responsibility and sustainability. Consumers are more and more demanding and critical, and when they satisfy their needs, they attach less importance to primal (i.e. physiological) aspects and more importance to higher needs. However do they always bring higher quality of life for a consumer?

Consumers judge products by expected benefits, so called added value that can be provided by these products or services. Facing a diverse product assortment, they choose between cheaper offer of discount stores and more luxury, highly ranked goods, taking into consideration value for money. As emphasized by e.g. Kiełczewski (2008) and Olejniczuk-Merta (2007) until recently Polish society was considered as rather conservative about nutrition. At present Polish consumers' attitudes evidently evolve towards ecology, acceptance of global products, regionalisation, ethnocentrism (acceptance of domestic products), tradition, interest in high quality, healthy and low-processed food. Also a concern for the environment

(often related to the level of ecological awareness, demand for ecological products, preferred consumption model) is becoming an important element. Consumers are getting hungry for knowledge that they can use for e.g. making decisions, selection of goods of a minimal harmfulness for an organism and the environment, rational approach to a price and a quality or critical approach to a market offer and marketing messages (informational, promotional, educational) published by producers and salesmen.

Over the last decades, all over the world, in Europe and in Poland the consumption defined as sustainable and as the concept being the response to ecological and social problems gains in importance (Jackson & Marks, 1999, Comim, Tsutsumi & Varea, 2007, Degallaix & Klemola, 2008, Chesson, 2013). Sustainable consumption is the subject for studies of various fields of science, e.g. philosophy, sociology, psychology. In the economic approach it is defined as the direction for changes in consumption determined by innovations and their effects observed in the social and economic sphere. Popularity and legitimacy of sustainable, responsible consumption is one of the main trends that have impact on practice of companies, including the ones connected with food market. The sustainable consumption is manifested not only in consumers' ecology- or justice-orientation, but also in the intergenerational responsibility. The sustainable consumption concept objects to producers' unfair treatment of consumers. Companies operating on the food market get more or less voluntarily involved in activities supporting the sustainable consumption and development. The reflexion of that approach is defining objectives of the social policy, action strategies that are beneficial for consumers. The studies of Delpal and Hatchuel (2007), Gonzalez, Korchia, Menuet, and Urbain (2009) show that in many cases at least one out of two consumers is ready to pay more in order to respect social or environmental issues. **Other interesting studies that are worth mentioning are the results of "2010 Cone Cause Evolution Study" that shows that the group of consumers who require their favourite brands to be engaged in social issues, is growing. In over 15 years, the number of American consumers preferring engaged brands doubled, from 20 up to 41%. Two out of five respondents said they had bought a product because of engagement in social or ecological issues, and four out of five admitted they had changed their favourite products to those brands that were involved in crucial social issues. However in these situations the condition was the fact that the products had similar price and quality. On the other hand the results of the report of** 2016 "Cone Communications Employee

Engagement Study" indicate that every second respondent does not want to work for a company that does not have strong social and environmental commitments[1].

Kiełczewski (2008) postulates different way of thinking of the ways of satisfying needs, aiming at the consumption that does not generate unnecessary environmental and social costs. Szwacka-Mokrzycka (2015) underlines globalisation process as well as unification of consumers' behaviours in the global perspective. In author's opinion the consumption should be considered as the process encompassing popularisation of products available on the global markets. That situation leads to unification of consumption and tendencies in changes of consumers' behaviours. It is supported by the willingness to create a modern style of life as well as by consumers' interest in convenience food, ability to buy global products and increase in spatial mobility.

In developed economies, in the era of consumerism, consumers extend the scope of needs satisfied via consumption. Food is not treated as a must, but is considered as a pleasure combined with some concept, values etc. For example in known retail network, offering fast food products, it has become trendy to introduce healthy food and pay attention to important social topics by getting involved in various socially useful campaigns. Tarcza (2015) in his theoretical considerations, indicates that it can be stated that increasing people's awareness of their obligations regarding e.g. quality of environment, nature, will motivate them to modify their behaviours and reduce a negative impact on environment.

A crucial element supporting consumption development in the 21st century are innovations, due to which social and economic needs are satisfied with innovative ideas, products, services, business models. Innovation is the condition of social and economic development as well as the element of success of companies operating on domestic and international markets (Research and Innovation performance in the UE, 2014, European Innovation Scoreboard, 2009). The market operators are even forced to introduce constant innovations that are the response to fast changing market tendencies as well as consumers' evolving expectations.

As indicated by Łuczka (2016) the current level of recognition of sustainable consumption issues and the factors that have impact on it is insufficient, thus further studies over that topic are recommended. In this publication the authors focused on consumers' perspective. The aim of the article is to define consumers' awareness and knowledge of the term of the sustainable consumption. Individual consumers have an important role to fulfil in aiming at the sustainable consumption – they need to be ready to execute such consumption model and rules of the sustainable consumption. The awareness of that term is a necessary condition for

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[1] http://www.conecomm.com/research (accessed on 02.11.2017).

changes of consumers' behaviours and consumption model that will execute the postulates of sustainable consumption.

2   Data and Methods

The publication was prepared on the basis of primary materials from the questionnaire survey conducted via direct interview technique in the Department of Economics and Economy Policy in Agribusiness at the Poznań University of Life Sciences, in 2017. The survey was carried out among the citizens of wielkopolskie voivodship. Respondents were selected by quota and purposive sampling method. This approach enabled to build the sample structure so that it could correspond with the structure of Wielkopolska citizens per age and gender. There were total 433 interviews conducted[2].For the purposes of this publication, there were used the answers to the questions regarding consumers' awareness of sustainable consumption, e.g.: "Have you heard of the following trends – consumer phenomena?", "Which of listed trends are interesting to you? Please indicate the ones you identify with the most.", "How can you describe what sustainable food consumption means?". There were open- and closed-ended questions. Closed-ended questions are used when a researcher wants to diagnose respondents' attitudes to selected categories (units). Open-ended questions enable respondent's freedom of expression. The method used for examination of the content was a content analysis, used for surveying e.g. press articles, posts on internet forums etc. An important element of a content analysis is creation of the system of statement categorisation (so called key), which is used for assigning respondents' statements into a suitable category. This enabled quantitative analysis of an open-ended question. The key was created by means of emergent technique, in which categories are created

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[2]   Out of all age brackets from 18,54% of them were women and 46% were men. The interview was representative as it encompassed similar numbers of respondents of both sexes in relation to latest demographic data of the central statistical office (GUS), that show that the population of women in Poland is higher compared to men's and amounts to 51,50%. Most of them were respondents from the age group 35-44 (over 19%, with 52% of them being women and 48% being men). The next ones, in terms of the number, were three age groups: 18-24, 25-44 and 55-64, each of them having ca. 16,4% share in the surveyed group. The group „65 and more" was slightly smaller (15,9%). In the sex structure the most distinguishing was the first age bracket – 59% of women and 41% of men. These differences did not have any negative impact on the results of conducted surveys. They also did not vary from other commonly available surveys. Both for women and men, the average age amounted to 44 years with some minor differences. The survey was conducted in 74 locations; the largest group were citizens of Poznań (43%). People with higher education definitely prevailed (33%). 45% of respondents claimed they had an average standard of living – they can afford every-day living expenses, but they have to save money for more expensive items.

only on a basis of collected empirical data created by respondents' spontaneous statements and the final key contained the set of categories. The unit of analysis was one respondent's statement that contained an answer to above-mentioned question. In one statement a respondent could disclose more than one risk caused by changing into sustainable consumption in a household (question with multiple answers). Subsequently the answers were subject to a factual analysis using the elements of a content analysis developed by Berelson.

For the statistical analysis of the data descriptive statistics and frequency analysis has been used. Due to the non-random sampling results presented in the paper cannot are not fully representative, however structure of the sample reflects the structure of general population in terms of age and gender.

3 Results and Discussion

The test participants were asked to indicate which items from the listed trends are of interesting to them. It should be pointed out that the subject of the analysis has been the directions of changes in consumption related to and associated with the development of the idea of sustainable consumption. The most important trends of consumption include tradition (95%), globalization (72%) and high-quality food (69%). Half of test participants are familiar with regionalism (49%) and eco-consumption (48%). More than 2/3 of the test participants showed the knowledge of the trend in consumption known as a responsible consumption (40%), overconsumption (39%), and smart shopping (34%). Less known consumer trends were deconsumption, freeganism, egocentrism, housecentrism or the collaborative consumption and prosumption. To deepen the question of knowledge of the observed trends of consumption, the test participants were asked to identify those trends, with which they identified most strongly, with which they are interested in. Their identification may indicate what behaviors may soon manifest themselves among consumers, and to which direction the consumption patterns will change.

Among the directions of change that fit into the idea of sustained consumption, the greatest interest presented: tradition (61%) and high-quality food (36%). Nearly every sixth test participant pointed to globalization (16%), regionalization (17%), eco-consumption (16%), responsible consumption (18%) and smart shopping (15%). The remaining directions were of marginal importance for the consumers (Figure 1).

Figure 1 **Knowledge of trends and interest in them included in the idea of sustainable consumption, in the opinion of test participants** [3]
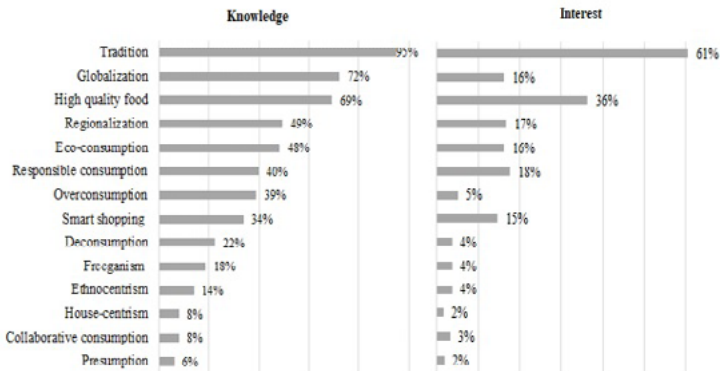
Source: Own research (N = 433).

Only 43% of consumers have chosen to describe what the concept of sustainable consumption means to them. This means that this group has knowledge of sustainable consumption, which allows them to formulate their own "definitions". Consequently, this knowledge goes beyond the superficial knowledge of (often resulting from a prior contact with the concept). Associations assigned by test participants to sustainable consumption are shown in Figure 2. To deepen the quantitative analysis, the featured text has been enhanced with selected quotes from the statements of test participants within an identified category. Research results indicate that the average number of associations per 1 answering person was 1.79. This may mean that the test participants focused on issues which have been most important for them. The presented categories provide a picture of sustainable consumption in the minds of consumers, pointing to its manifestations, sometimes to the barriers, risks and opportunities for development and the adoption of such a model of consumption in their households. An extensive range of associations proves the earlier contacts of respondents with a variety of content of

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[3] smaller (15,9%). In the sex structure the most distinguishing was the first age bracket – 59% of women and 41% of men. These differences did not have any negative impact on the results of conducted surveys. They also did not vary from other commonly available surveys. Both for women and men, the average age amounted to 44 years with some minor differences. The survey was conducted in 74 locations; the largest group were citizens of Poznań (43%). People with higher education definitely prevailed (33%). 45% of respondents claimed they had an average standard of living – they can afford every-day living expenses, but they have to save money for more expensive items.

messages about the sustainability of consumption. However, it does not have to confirm their behavior in the practice of everyday life. It is important to note that the categories: adequate amount, essential nutrients, adequate quality, health concerns can be classified within the group associated with applying a proper diet.

More than 41% of the answers involved sustainable consumption with a sufficient amount of consumption, wasting, purchase of food. Test participants in this category pay attention to issues related to dietary behaviors and, in particular, the proper recognition of the reported demand and observing the amount of ingredients supplied to their bodies from food, taking into account the needs and requirements in terms of the diet and lifestyle of consumers.

This is confirmed by several quotes from the test participants, for example: *"Eating food in amounts corresponding to the needs of the body", "Consumption corresponds to the actual demand and there is no phenomenon wasting food", "Responsible consumption, adequate to the needs", "Consumption compatible with my lifestyle."*

Sustainable consumption has also been associated with behavior in terms of proper food storage that reduces waste and with purchasing behaviors where products are selected responsibly, without excessive purchases. This can be indicated by several statements, e.g.: *"Avoiding buying too much food which later perishes", "Buying such quantities of food that can be eaten", "It's such a consumption, in which the consumer buys food responsibly, taking into account how much they can eat, without throwing away food products and selects such products that impact positively on the environment".*

Figure 2 **Description of the concept of sustainable consumption by consumers**

Appropriate amount	41%
Lack of wasting	23%
Reasonable behavior	15%
Deliberate purchasing	15%
Lack of the adverse influence on environment	15%
Indispensible nutritional ingredients	12%
Appropriate quality	9%
Care of the future generations	9%
Ecological products	8%
Health reasons	7%

Other associations:	
Appropriate origin	5%
Appropriate caloric value	4%
Others	4%
Demand-supply balance	4%
Satisfying the basic need	3%
Low price	3%
Economic development	1%
Indispensible nutritional ingredients	1%

Source: Own compilation; N=188, multiple answers possible, values do not add up to 100%.

The forms of behavior indicated by the test participants which can help reduce or even eliminate food waste were associated with the issue of rationalization of consumption (supply of suitable quantities, taking into account the needs of the body), informed selection of products and consumption of ecological products.

An important issue, associated with the adequate amount and behaviors in storing and purchasing, is wasting food. This issue often occurred in the statements of the test participants: *"Without throwing food or wasting it" "Using your own shopping bag", "Rational purchases", "Avoiding buying products for later", "The use of all food resources in an optimal manner, so there is no waste of food ",* and the need for an action to contribute to this result (the statement: *"Actions to avoid wasting food").*

The next category, namely sensible behaviors in terms of food consumption, was associated by the test participants with conscious, rational and responsible behavior in this regard. This type of associations was demonstrated in the words *"Consumption which is responsible and aware of its effects", "Rational nutrition" "Shopping rational from the ecological and economical point of view" "Responsible consumption", "Responsible food purchases".*

The test participants also pointed to the need to control spending on food and to control the source of nutrients and energy ingredients, which are supplied with food. Examples of the statements include *"Controlling the expenses on food and the type of consumed energy," "Long-term savings."*

The lack of a negative impact on the environment is another of the identified categories of associations about the sustainability of consumption. It is strongly linked to the waste of food and restrictions on the consumption. For this reason, consumers knowingly postulate to do no harm to the environment by stating, for

example, that the sustainable consumption is a consumption that *"Does not harm the environment"*,*"Conscious of the use the natural resources"*. Respondents paid attention to the use of biodegradable packaging, sorting of waste; for example, the expression *"Taking care of the environment, the use of biodegradable packaging, segregation of waste"*. Attention was also paid to limiting the emission of waste or the selection of such products, which can harm the environment to an insignificant extent only. Examples of expressions: *"It limits the generation of waste through the life cycle of products and services", "Selection of products that do little harm to the environment"*.

Behaviors associated with a proper nutrition are important for consumers. Therefore, it was considered advisable to extract the category of essential nutrients, which is also the first of the discussed categories, i.e. the appropriate amount. The respondents associated their diets with the need to provide the body with vitamins, minerals ingredients and nutrients. The test participants claimed that the variety of products and foods, and the method of food processing are important in this regard.

Within the category of suitable quality and health objectives, the test participants associated the consumption of food with matters of health. It was noted that properly selected products, the acquisition of healthy, unprocessed food, selected for its nutritional value, are important in this regard. In addition, there is also the awareness of what and how much one should eat and the need to avoid certain products, which are unfavorable for health. In addition, this covers the knowledge about the quality of the products in connection with the acquisition of them from well-known producers (including regional producers), who care about the quality of their products, selection of high-quality products, i.e. marked with quality certificates (of community or national characters).

Another association related to the sustainable consumption was concern about future generations, expressed in statements such as *"Consumption, which will satisfy the needs of future generations" "Cares for the issues associated with nature and future generations"*. The respondents mainly paid attention to the effective exploitation of non-renewable energy sources, minimizing the absorption of natural resources, the most optimal, conscious, appropriate, sustainable, uniform and longest possible use of natural resources and services at the level of individuals and others, meeting the needs and improving the quality of life.

Attention was also paid to the characteristics of food and its method of production, linking sustainable consumption with ecologic food. This means that they associate ecologic food with better health parameters. A low degree of processing was attributed to these products.

In addition to the above mentioned categories, the consumers involve sustainable consumption with economic development, preserving the market balance between supply and demand, the origin of products and the appropriate calorific value, as well as the necessary nutrients, which undoubtedly is an element for health considerations. These types of declarations had, however, definitely lower frequencies among the test participants.

In works on sustainable consumption that includes a variety of its manifestations, it is indicated that the term sustainable consumption is not widespread among the test participants. The research of Rejman, Kowrygo, and Laskowski (2015) revealed that his knowledge had been declared by only 35% of respondents, but only 18% of this group correctly defined sustainable consumption. Most of the test participants mistakenly equated this concept with balanced nutrition. Respondents who were aware of sustainable consumption pointed out that factors for food choices were the conditions for ecological premises such as: the origin from local suppliers, from ecological production, possession of a certificate. According to the authors, consumers are ready to change the diet in the direction of sustainable consumption. However, it is necessary to popularize this idea, among else in the terms of human health and ensuring food security.

Research of Dąbrowska, Bylok, Janoś-Kresło, Kiełczewski, and Ozimek (2015) focused on learning the consumers' competences and their importance for stimulating sustainable consumption. The results of this research revealed that the respondents based their knowledge on sustainable consumption on four principles: ethics and local awareness, planning, ecology (care for environment) and consciousness (know-how). The test participants treated sustainable consumption as a form of increasing prosperity. The degree of respondents' competence about sustainable and pro-ecological consumption was high, however, this is not equivalent to their practical behavior. During the study, consumers were trying to a good image, including behavior indicating sustainable consumption.

Another study in the area of sustainable consumption was conducted by Jaros (2016). It shows that as many as 31.4% of test participants believe that their consumption is unsustainable, with the answer "mostly yes" selected only by 21.4% of the surveyed. The answers are strongly dependent, among other issues, on the place of residence, education and financial situation. It has been observed that emotions in relation to sustainable consumption did not coincide with the activities, e.g. residents of rural areas often declared that their consumption is not sustainable, but their behavior showed that it actually is. The study also indicated confusion about the definition of sustainable consumption. It was noted that the positive factor, which have resulted from the research, was the growth of consumers' awareness (Jaros, 2016).

The research whose subject was a part of the idea of sustainable consumption, was an examination performed by Goryńska-Goldmann, Adamczyk, and Gazdecki (2016) and Nestorowicz (2015), examining the knowledge of respondents about the marking of food products in relation to sustainable consumption. It was concluded that the respondents had little knowledge about the marking of the fair trade products and they had better recognition for European logo for ecological food products. The respondents who declared a higher level of knowledge about the fair trade products more often recognized their logo and European ecological signs. They also admitted that they read information on product packaging. It can be stated that this group belongs to the more informed users. However, as shown by the author's research, the knowledge about fair trade products is not reflected in making purchasing decisions. In Poland, ecological food is more popular than fair trade products. However, when making purchasing choices, ecological products and fair trade products are not popular among the Polish consumers. As is apparent from the performed studies, the behavior of Polish consumers does not always subscribe to the concept of sustainable consumption, but they are willing to make changes in the current consumption.

4   Conclusion

Based on the conducted studies, it can be concluded that consumers have limited knowledge of the sustainable consumption concept. Most of the respondents came across terms related to the concept of sustainable consumption, but it was difficult for them to identify these links. The level of awareness of these terms does not seem to be caused by consumers' actual interest but on the perception of information which are reaching consumers from different sources. Moreover, respondents have declared the greatest interest in "tradition" and "high quality food", what reflects current trends on the Polish food market.

Fewer than half of the respondents were able to interpret sustainable consumption on their own. However, it is worth to add that the range of behaviours declared by the respondents proves that they correctly identify this concept. Respondents referred mainly to the reduction of food intake, the optimization of household food supply and the reduction of food waste. Less frequently, they have addressed topics related to the positive impact on the environment, which may be an indirect effect of the indicated behaviours.

Identification of the level of sustainable consumption awareness among consumers should be the first step in promotion campaign of such consumption patterns. It should also be stressed that consumers can demonstrate behaviour related to the sustainable consumption model but do not link it with this concept.

Undoubtedly, a higher level of consumer awareness will certainly be positively related to the range of sustainable behaviour.

Assuming, that the sustainability of consumption is a desirable model of consumer behaviour, the results presented in this paper indicate communication challenges for social policy makers, businesses and non-profit organizations.

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CONSUMER BEHAVIOUR CONSEQUENCES WITHIN THE ONLINE ENVIRONMENT IN CONTEXT OF MULTISCREEN

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Abstract

The interaction of consumers and marketers within the Web environment, particularly for purchasing is a growing area of importance. The expansion of the online environment and its gradual integration into ordinary people's lives caused that businesses have moved their marketing activities into the Internet or digital sphere. Nowadays people are able to catch more information from more than one screen at the same time. This phenomenon is called as "multiscreening". When marketers think of multiscreening, they often see it is a new challenge or obstacle. It unlocks the golden age of digital advertising. It is interesting mainly for online campaigns. Business online communication and its impact on consumers can therefore be considered as the current topic to be addressed. Presented paper deals with a comprehensive review of multiscreen marketing opportunities. The purpose of this paper is to evaluate the marketing communication in online environment as well as its effects on consumer behaviour. To fulfill the aim of this paper, marketing research was conducted (a total of 338 respondents were involved). The results showed that it is extremely relevant in today's digital era that businesses make use of the opportunities of the online environment and benefit from the advantages they offer.

Keywords: *Consumer behaviour, device, multiscreen, online environment*

JEL Classification: *M31, M39*

1   Introduction

Nowadays, consumers face the information flood that is being generated and transmitted by all types of media (Miklošík, 2015). With the development and increased use of the internet together with the constant growth in the number of its users, it is commonplace that the companies present themselves on the internet and also use the internet to acquire new information, ideas, as well as feedback from their customers (Berčík, Virágh & Šimončič, 2015). With the expansion of the Internet, social networks and mobile technologies, consumers are having much more possibilities to gather information regarding their planned purchases (Solík & Laluhová, 2013). In today's markets, companies have greatly shifted their focus towards customers as the entities creating the demand for companies' products and sources of the revenues. The consumers shape and influence the current market trends with their desires and preferences; this requires reassessing and reshaping the offers and communications from companies (Kuchta & Miklošík, 2017). Over the past few years, the way of looking for information within purchasing decision-making has changed a lot, and nowadays consumers tend to research information more actively using inter alia websites and social media. To get information, consumers search online and access many sources via search results (Zach, 2015). However, new media outlets have created a multitasking way of life. Consumers' attention is divided between several media types and the digital environment is 'stealing' an increasing number of people from television to mobile and desktop devices connected to the Internet (Kuchta & Miklošík, 2017).

Marketing managers need to stay in touch with current changes in consumer behaviour. It is crucial for them to identify and respond to recent trends and reflect them in their marketing strategies (Miklošík, 2015). Consumer behaviour is driven by both emotions and cognitions (Solomon, Russell-Bennett & Previte, 2012). Consumer behaviour has changed substantially over the past 8 years (Šugrová, Šedík, Kubelaková & Svetlíková, 2017). Because a number of technologies have become more mature, companies are getting new possibilities for fulfilling customer needs. On this basis, it was reflecting about what consumer expectations are in such a new world. Authors came up with 4 characteristics.

There are undoubtedly more of them, or different ones, but these work well for today´s customers. They are (Belleghem, 2015):

1. Personalized products and services.
2. Convenience as the new loyalty, as the new norm.
3. Personal treatment.
4. Desire to buy from ´awesome´ companies.

A typical feature of a modern consumer is that it uses multiple devices at once, it means multiscreen. For example, during watching TV consumers are watching an email box, chatting on social networks or searching for information that has interfered them in the broadcast as well (Krnáčová & Benkőová, 2016). In the digital age of a two-second attention span, multi-screening has become more prolific than ever. As the name suggests, multi-screening refers to the use of multiple digital devices at once, for example, mobile phones and the television. Sequential screening occurs when you move between devices, whilst simultaneous screening involves the use of two devices at the same time (Mediavision, 2013). Multiscreen is explained as "the situation in which the consumer is exposed to information and campaigns on multiple screens". Information can be accessed through combination of various channels including many kinds of screens: TV, computer, tablet or smartphone. It is precisely this fact that points out to businesses that it is important to be aware of all ways in which they can reach their target groups (Labská et al., 2014). The boom of smartphones and tablets has caused that it is possible for people to be in a store and virtually on the web at the same time. Separating online and offline is losing meaning. Consumers want to shop in stores and on the Internet as well. Seller website serve as a source of information for buyers who do not usually buy immediately on the Internet, their aim is to get information and then make a purchase in the shop (web-to-store). 70% of Europeans realize their purchases in this way. Half of Europeans said they were using cost comparators to find the best deal. Even in this case, the website plays a big role (Trebuľová, 2014). The aim of online marketing is to increase website traffic and increase seller sales. To properly set up campaign, it is essential to well know the customers well and be able to reach them at the right time on the right devices they use. This also shows the topicality of solved problems within online marketing (Trebuľová, 2014). Advertisers are able to reach users across devices with Google remarketing campaigns. Google announced an important update concerning their *Google Analytics Remarketing Audiences* which will change the way advertisers and marketers target audiences online (Figure 1). This is a significant development, as Google did not support cross-device retargeting. For example, currently, if a user comes to an advertiser's site on a mobile phone, the advertiser

is not able to retarget that user later on a desktop, unless they also visit the site on desktop. If that happens, the user is effectively listed twice, and the frequency capping and negative list exclusion is set at the browser or mobile ID level on each device. That was true even for users signed into a Google account on multiple devices because Google has relied on cookies and mobile IDs to identify users for remarketing lists (Marvin, 2016).

Figure 1 **Cross-device retargeting**

Source: Marketing land. 2016. Retrieved from https://marketingland.com/google-cross-device-remarketing-launches-192819.

As with Facebook, Google is taking a deterministic approach, and cross-device remarketing is limited to signed-in users (Gmail alone has one billion monthly users). Essentially, Google will now start showing ads to users across multiple devices for advertisers using Remarketing Audiences built with Google Analytics. Cross-device remarketing has existed for some time now for advertisers using remarketing audiences built within AdWords, however this method was a manual and laborious task, requiring considerably more time and technical 'know-how' to achieve (Mach, 2017). This new method, using the very simple audience-building tool in Google Analytics, gives advertisers the ability to reach more customers across their omni-channel buying journey, a change which has brought this method in line with platforms like Facebook who have been doing this for some time.

2   Data and Methods

The aim of the presented paper is to make a comprehensive review of multiscreen marketing opportunities and evaluate the marketing communication in online environment as well as its effects on consumer behaviour. We present the outcomes of research produced by MillwardBrown – a multinational agency which works with many local and global brands – including 90% of the world's leading brands – to help define brand purpose, develop winning advertising, engage consumers, and drive brand growth. These outcomes provided basic worldwide overview of online environment, multiscreen and consumer behaviour, based on which we were able to perform a comparative analysis in SR conditions.

In order to achieve the formulated aim of the paper were collected and used primary and secondary sources of information. Underlying secondary data were obtained from available literature sources, i.e. from professional publications from domestic and foreign authors and organizations. When processing of individual underlying data and formulating conclusions of the paper were used methods of analysis, synthesis, induction, deduction and the comparative method. In order to meet the objectives of the paper, marketing research was conducted. Marketing research was conducting in the period from September 2017 to December 2017 by method of interview using a structured questionnaire. The questionnaire was processed in *Google Forms* and people were asked to fill in on social networks and in emails. Some questionnaires were filled in printed form by personally meeting. The research was focused directly on online environment, multiscreen, online advertisement and purchasing behavior via Internet. Finally, in the research outcomes were involved 338 respondents from Slovak Republic (Table 1). Some of the processed questions are presented in this article.

Table 1 **Characteristics of respondents**

Category of respondents	Number	Age structure of respondents	Number
Male **Female**	161 177	15–20 years 21–30 years 31–40 years 41–50 years Over 51 years	81 83 66 55 53

Economic activity of respondents	Number	Educational structure of respondents	Number
Employed Unemployed Student Other (retired / on maternity leave)	176 10 139 13	Primary education Secondary education without A level Secondary education Higher education	0 81 119 138

Source: Results of the research.

The questionnaire was evaluated with the use of contingency tables, which were prepared by Excel, under which they were subsequently developed graphic representations. For a deeper analysis of the obtained results, there were set out two assumptions (assumption no. 1 – There is a preference for multiscreen devices by age group; assumption no. 2 – Reasons for simultaneous multiscreening differ by gender) and four hypotheses. To test the formulated hypotheses, the methods of Pearson's chi-square test, Cramer's contingency coefficient, Phi coefficient and Kruskal-Wallis test were used.

3   Results and Discussion

When considering consumer behaviour, there is a significant difference in the distribution of time spent across devices on various markets. Overall screen minutes vary significantly by country, from 9 hours in Indonesia to just over 5 hours in Italy. The average user spends "on screens" up to 7 hours per day and thereof approximately 2 hours per day on multiple screens. This is the result of a study by *MillwardBrown Agency* (2014), which analysed consumer behaviour in 30 countries of the world, including Slovakia (Figure 2). The research also shows that the average Slovak user spends the most time by watching TV screen (totally 106 minutes), followed by smartphone screen (98 minutes) and TV (95 minutes), while tablets are the least popular screen among Slovak users (52 minutes). The Slovak trend is different unlike the world where users spend time on smartphone 147 minutes per day, 113 minutes on TV, 108 minutes on PC and 50 minutes on tablet. However, it can be assumed that similar development will occur in Slovakia, as consumers are increasingly use mobile phones to search for information.

Figure 2 **Daily distribution of screen minutes across countries**
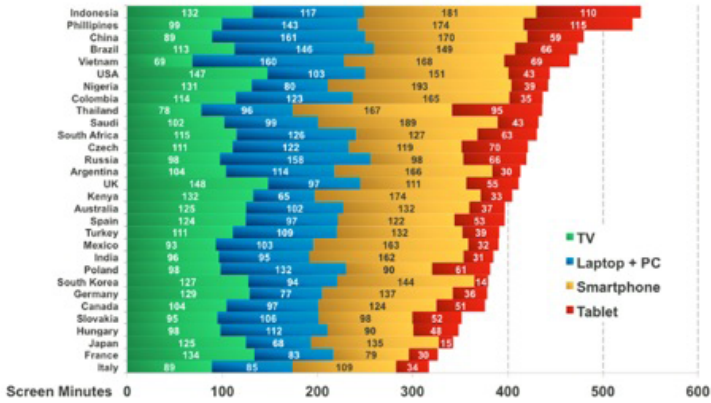
Source: MillwardBrown. (2014). *AdReaction: Marketing in a multiscreen world.*

All kinds of media screens can achieve every brand-building tasks, but various screens do imply certain attributes and can play specific roles. Overall, TV advertising is the more well received, while digital ad receptivity is lower across devices. Combining receptivity with screen time shows that TV remains the largest media opportunity due to highest overall receptivity and still strong minutes. Collectively, digital still adds up to a huge opportunity (bigger than TV) if low receptivity challenges can be overcome (Figure 3).

Figure 3 **Multiscreen opportunity plot – screens**
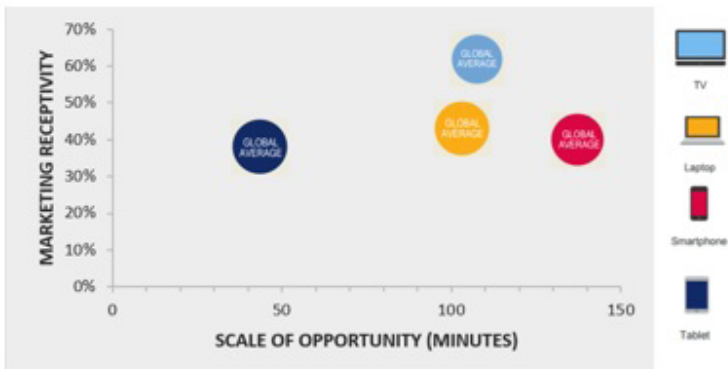
Source: MillwardBrown. (2014). *AdReaction: Marketing in a multiscreen world.*

Explanatory notes: Scale of opportunity = minutes per device. Marketing receptivity = average of favorability (very/somewhat favorable) and attention (pay at least some attention)

The graph below (Figure 4) presents the results of a research asking consumers which of the following devices, if any, do they use simultaneously while watching traditional live TV programming on a TV screen. It was found that 41.4% of respondents most often use a smartphone while watching TV. The second most favourite device marked by 30.5% of respondents is computer or laptop. We can say with certainty that tablet is not preferred screen device while watching TV programming on a TV screen for Slovak users. Totally 14.8% of respondents stated that they did not use any device simultaneously while watching a TV. According to worldwide surveys smartphones and laptops dominate daytime screen use while TV, the same situation is confirmed in our research. We consider that popularity in using smartphones and laptops varies by age of users as we document further in this paper.

Figure 4 **Devices used simultaneously while watching TV programming on a TV screen**
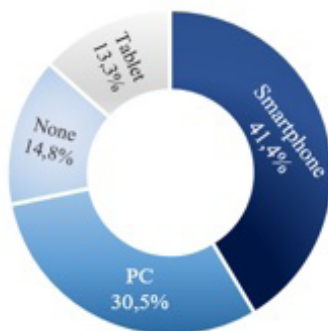
Source: Results of the research.

This statistic shows the share of individual devices most commonly used while watching TV by age group (Figure 5). Respondents in age group 15-20 marked clearly smartphones as most often use device with 35.7% of total share in this age group. As second simultaneously use device is PC with 21.4% share followed by tablet (15.6%). Only 4% of this age group said, that they did not use any device while watching TV. Different results occurred in age group 21-30 years. Computer placed first in the total number of respondent answers (46.6%). It can be caused by the fact that people in this age mostly study at university, so they use computer

almost all day for searching information to prepare themselves for university studies. On second position in total share of answers was smartphone (18.6%) followed by tablet (8.9%) and only 10% of respondents argued that they did not use any other device. We mentioned that tablet was not common use device for Slovaks as well as in worldwide surveys. So, we interested which age group use tablet as multiscreen device most often. The results show that both age groups, people between 31-40 years and 41-50 years prefer tablet as multiscreen device while watching TV. We can claim that non-use of the multiscreen device increases with increasing age.

Figure 5 **Devices used simultaneously while watching TV programming on a TV screen by age groups**
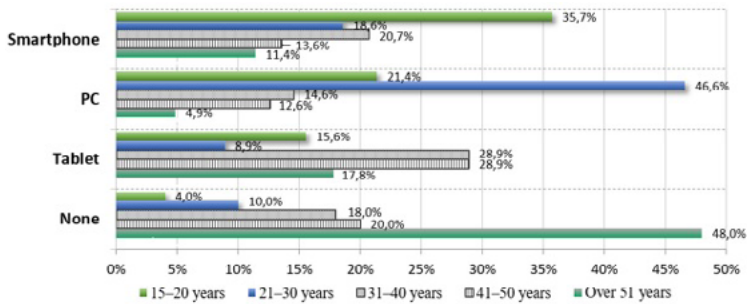
Source: Results of the research.

Because of the need to determine whether there exists a statistical dependence between the preference of multiscreen device and age group we formulated zero hypothesis and tested it with the use of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient (significance level of alpha = 0.05). The result of Cramer's contingency coefficient was equal to 0.4201477, what can be interpreted as a moderate relationship between tested variables. Based on the results of mentioned test, it can be stated, that the H0 hypothesis must be on the level of significance 5% rejected and adopted must be the H1 hypothesis talking about the interdependence between tested variables.

Although various studies demonstrate that TV remains strong in some markets, it's evident that consumers are becoming increasingly multi-device oriented, as we also demonstrate on Figure 6. TV is also often being viewed partially respectively passively. This statistic presents the most common activities which Slovaks do simultaneously while watching TV- totally and by gender. Respondents

were asked, why do they use a second device (laptop, smartphone or tablet) when they are watching TV.

More detailed information shows the graph below. Respondents were asked to indicate max. 3 activities, according to their opinion, which activities they most often do simultaneously with watching traditional TV programming on a TV screen. ´´Look up product info or deals related to ad I saw´´ and ´´fill time during commercial breaks´´ were two the most performed activities with the highest percentage share. The least common activities were occurred ´´checking sports scores´´ marked only by 9% of all respondents and ´´surfing the Web not TV related´´ marked by 15% of respondents.An interesting result is apparent when comparing the responses of men to women. While for women is the most common to look up product info or deals (30%) for men it is filling time during commercial breaks (31%). The percentage structure of responses between men and women is almost exactly opposite in case of filling time during commercial breaks where is 19 percentage difference.

In addition, women reported engaging in TV just for background noise more than men, while men tried to find more information about what´s on TV more often. Based on these facts, we can conclude that our scientific assumption was confirmed. Advertisers should take note that while viewers may be splitting attention between two (or three) screens, high percentage of smartphone, laptop and tablet owners searched for product information and for coupons or deals while the television was on.

Figure 6 **Reasons for simultaneous multiscreening**

Figure 6: Reasons for simultaneous multiscreening
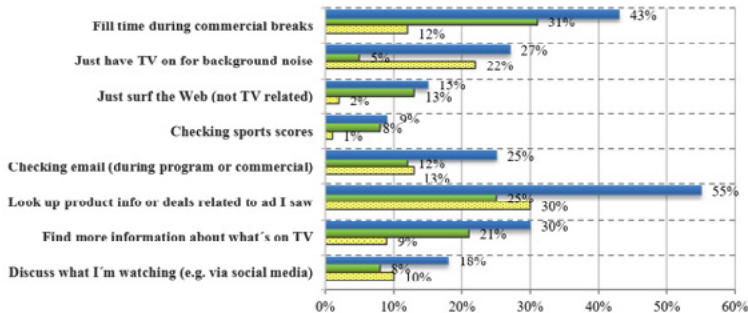
Source: Results of the research.

We also analysed the answers to this question by using Kruskal-Wallis test, the results are shown in Table 2. In connection with the evaluation of the question, we wanted to find out if preferred activities for simultaneous multiscreening differ

between the people by gender. For this reason, the following hypotheses were formulated:

H_0: *There are no differences in responses by gender.*

H_1: *There are differences in responses by gender.*

Based on the theoretical level of significance, which was compared with a significance level of alpha = 0.05, the H_0 hypothesis of the absence of differences in responses was rejected. Based on these facts, we can conclude, there are statistically significant differences in preferred activities for simultaneous multiscreening between men and women.

Table 2 **Results of Kruskal-Wallis test**

Kruskal-Wallis test:	
K (Observed value)	27,3281
K (Critical value)	5,9915
DF	2
p-value (Two-tailed)	< 0,0001
alpha	0,05

Source: Own processing, XLStat.

4   Conclusion

The aim of the presented paper was to make a comprehensive review of multiscreen marketing opportunities and evaluate the marketing communication in online environment as well as its effects on consumer behaviour. In the theoretical part, we tried to explain why people use multiple screens. There are many reasons for multiscreening. Some people focus mainly on the TV and fill downtime (ad breaks etc.) with digital distractions. Other people focus primarily on a digital device, and delays on this device can drive attention to the TV. Some experts view multiscreen proactively and are trying to capitalize on the opportunity to amplify experiences between brands and consumers. Others view it more defensively and worry that multiscreen could potentially result in a "lack of attention" for traditional approaches. Those in the middle are not yet sure if it presents opportunity or threat, but are investigating curiously and adjusting their approaches accordingly. In order to meet the objectives of the paper, marketing research was conducted. For a deeper analysis of the obtained results, there were set out two assumptions (assumption no. 1 – There is a preference for multiscreen devices by

age group; assumption no. 2 – Reasons for simultaneous multiscreening differ by gender).

The average user spends "on screens" up to 7 hours per day and thereof approximately 2 hours per day on multiple screens. It was found that 41.4% of respondents most often use a smartphone while watching TV. The second most favourite device marked by 30.5% of respondents is computer or laptop. We can say with certainty that tablet is not preferred screen device while watching TV. Totally 14.8% of respondents stated that they don´t use any device simultaneously while watching a TV. According to worldwide surveys smartphones and laptops dominate daytime screen use while TV, the same situation is confirmed in our research.

Subsequently, we focused on individual devices most commonly used while watching TV by age group. Respondents in age group 15-20 marked clearly smartphones as most often used device with 35.7% of total share in this age group. As second simultaneously used device was PC with 21.4% share followed by tablet (15.6%). Different results occurred in age group 21-30 years. Computer placed first in the total number of respondent answers (46.6%). We can claim that non-use of the multiscreen device increases with increasing age.

Finally, we found out which are the most common activities Slovaks do simultaneously while watching TV- totally and by gender. Respondents were asked, why do they use a second device (laptop, smartphone or tablet) when they are watching TV.

Looking up product info or deals related to advertisement and filling time during commercial breaks were two the most performed activities with the highest percentage share. While for women was the most common to look up product info or deals (30%) for men it was filling time during commercial breaks (31%). The percentage structure of responses between men and women was almost exactly opposite in case of filling time during commercial breaks where was 19 percentage difference. Because of the need to perform a deeper analysis of the issue, in the part Data and Methods, two assumptions were formulated, which have been tested with the use of the methods of Pearson's chi-square test, Cramer's contingency coefficient, Phi coefficient and Kruskal-Wallis. From their evaluation we can conclude that both assumptions were confirmed. TV is generally more of a starting point and digital devices are generally used more to continue/complete tasks. Multiscreen sequences are most likely to start on TV and continue on a smartphone. However, all screen sequences are possible. Receptivity is higher for TV than for ads on digital screens, but brands cannot rely TV ads alone. Consumers expect brands to be present on multiple devices and are impressed by those who find entertaining and useful ways of delivering across

screens. Different channels play different roles, both in terms of their effectiveness and implied messaging.

Marketers around the world are trying successfully put these principles into practice, as well as the perspectives of industry experts.

Acknowledgements

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CONSUMER PRIORITIES OF THE UKRAINIAN POPULATION IN THE MARKET OF PIG PRODUCTS

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Abstract

The main tasks of the study are: to determine the specificity of demand for certain types of slaughter pigs, to systematize the factors affecting it and to predict their impact on the short-term prospect.

Keywords: *the market for pig products, demand, fat, pork, revenues*

JEL Classification: L 66, Q 18

1   Introduction

Pork market is one of the largest food markets, the basis of its functioning has become the tradition, and its development has a significant impact on other food markets. The consumption of pork and fat is influenced by the location of the consumer (rural, city), characterized by different levels of purchasing power, dietary traditions, attitudes towards health, which affects the choices of pig slaughter products and their sources of income. Important factors influencing the consumption of pork are economic, religious, national, socio-cultural, as well as psychographic (relation to consumption of meat, etc.).

2   Data and Methods

The source information during the research was the normative basis of the state economic regulation of the pig products market, statistical and analytical information of the State Statistics Service of Ukraine, the Ministry of Agrarian Policy and Food of Ukraine. The calculations for the elasticity of consumer demand in the market of pig products were carried out using correlation-regression analysis. The balance method was used to substantiate the consumption of pork and fat for the future.

3   Results and Discussion

The results of the survey of buyers on the retail food markets of the cities of Kyiv, Khmelnytsky, Odessa show that the main factors influencing the choice of pork as a food product are sex - the vast majority of consumers of pork men, regardless of the fact that they often buy this type of meat exactly women; age is the target segment of consumers (78,3%) varies from 23 to 60 years, in the second place adherents of consumption of this type of meat - adolescents - is 11,9%. However, they do not prefer pork in their daily consumption by people aged 60-76 years, which make up 9.8% of the group of respondents; the purchasing power of the consumer is an important parameter in the choice of this type of meat; price - conditional element in combination with the previous parameter. According to researches, 63% of respondents consider the price factor to be an effective element in stimulating sales irrespective of the season [1].

During 2000-2016, the consumption of chilled pork per 41.5% per capita increased, while consumption of eats decreased by 32.7% and in 2016 it was 6.2 kg.

Thus, in 1991, the consumption of meat per capita in Ukraine was 74 kg, 28% of which was for meat, and 72% - for sausage wares. Together with the decrease in the solvency of the population, consumption of meat products decreased. In 2001, it was 33.6 kg, and the structure of sausage and meat was already 50%: 50%. In 2016 it was 54.4 kg per 1 person, 30% of which was consumed in the form of sausage products, and 70% - as meat. According to the forecasts of the FAO, by 2020, in the structure of consumption of meat by Ukrainians, 80% will be consumption of natural meat [2].

The proof of the above-mentioned tendency is the structure of the commodity assortment of meat processing enterprises, which, focusing on better satisfaction of consumer demand, expands the assortment of commodity positions of chilled and frozen meat.

The decrease in the consumption of fat, despite its traditional character, as one of the main types of food products of Ukrainian residents, is gradually decreasing, which is also an indicator of the level of material wealth of the population. A similar phenomenon was observed in the 30s of the last century in the United States. [3].

During 2000-2016, two periods can be distinguished in changing the choice of certain types of pig products. So, the first - 2000-2006, when the level of consumption of fat exceeded the consumption of chilled pork. It was characterized by a gradual increase in the purchasing power of the population while preserving the culture of food - consumer pork and fat were the priority products of consumers.

The second period - 2007 and to the present time. Despite the slight fluctuations in the purchasing power of the final consumer, the consumption of chilled pork exceeds the amount of consumption of lard, indicating significant changes in the nutritional structure of the population and, to a degree, on its availability and change in the taste preferences of the population.

It should be noted that by 2012 there was an excess of consumption of pork in rural areas compared with residents of large and small cities. In our opinion, this can be explained by the consumption of a significant amount of pork, which was produced in private peasant farms. Nevertheless, in the following years, the opposite situation can be traced, which indicates significant changes in the structure of food and consumer preferences of the urban population compared with rural ones. At the same time, in rural households, they consume much more fat than urban ones. This fact shows that rural residents, for some reason, in particular because of the lack of funds to purchase pork and the directing of a significant proportion of live pigs to compensate for the need for products of animal origin due to the consumption of lard. This tendency leads to an imbalance in the diet of the rural population.

An important indicator of a good nutrition of the population is to ensure the balance of its diets in accordance with reasonable consumption standards. It has been established that caloric nutrition of the rural population by 6.0% exceeds the average norms due to excessive consumption of fats and sugar (respectively 1.7 and 1.5 times higher than physiological norms of need).

The percentage of fats in the total caloric content of the rations surveyed population exceeds the norm by 1.5 times. The amount of total fat and saturated fatty acids in the diets of rural population exceeds the recommended norms by 1.7 times. Among the fats, the overwhelming majority of animal origin, due to which the body receives one and a half times more calories than at the expense of plant. The ratio of polyunsaturated fatty acids to saturated fatty acids is 0.7 instead of

1.0. The level of cholesterol in the nutrition of rural residents by 30% exceeds the normative indicators, increases the risk of manifestation of various diseases [4].

It should be noted that during 2005-2016 there was a significant difference in the consumption of pork in ten decile groups of households, depending on the level of their total income (Table 1).

The given data on consumption volumes of pork for the period of 2005-2016 on major decile groups indicate their growth regardless of the level of consumer income and place of residence. Thus, the highest growth rate of pork consumption among urban households is observed in groups 1-3 and 6, due to increased purchasing power of the population. In general, consumption has increased more than twice in all groups, but no rational consumption has been achieved. This can be explained by the considerable influence of substitute products on the consumption of pork, in particular, poultry meat, which in the structure of consumption occupies a prominent place.

Table 1 Dynamics of consumption of chilled pork in decile groups of rural, city and, in general, for all households, kg / person

Group	2005			2010			2014			2014 in % to					
										2005			2010		
	Total	Town	Village	Total	Town	Village	Total	Town	Village	Total	Town	Village	Total	Town	Village
1	2,8	2,9	2,7	4,9	5,5	4,2	7,4	8,4	5,7	264,3	289,7	211,1	151,0	152,7	135,7
2	3,9	3,7	4,3	7,1	7,3	6,9	9,0	9,5	8,2	230,8	256,8	190,7	126,8	130,1	118,8
3	4,5	4,1	5,2	8,9	9,3	8,1	11,2	11,9	9,8	248,9	290,2	188,5	125,8	128,0	121,0
4	5,2	5,1	5,3	10,1	10,2	9,7	11,9	12,8	10,3	228,8	251,0	194,3	117,8	125,5	106,2
5	6,1	6,2	6,1	11,8	12,1	11,4	13,9	14,3	13,1	227,9	230,6	214,8	117,8	118,2	114,9
6	7,2	7,2	7,1	13,7	14,1	12,7	15,9	16,0	15,6	220,8	222,2	219,7	116,1	113,5	122,8
7	8,6	8,8	8,1	15,5	15,7	14,7	17,3	16,7	18,7	201,2	189,8	230,9	111,6	106,4	127,2
8	8,1	7,5	9,9	18,2	18,8	15,5	20,1	20,1	20,0	248,1	268,0	202,0	110,4	106,9	129,0
9	9,3	9,5	8,8	18,6	18,1	20,9	19,1	18,8	20,1	205,4	197,9	228,4	102,7	103,9	96,2
10	12,3	12,5	11,9	22,6	22,2	25,2	26,5	25,5	30,2	215,4	204,0	253,8	117,3	114,9	119,8
Total	5,9	6,1	5,6	10,8	11,5	9,3	12,6	13,3	11,4	213,6	218,0	203,6	116,7	115,7	122,6

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

It has been established that during the investigated period the ratio in the volume of consumption of pork among the 10 and 1 groups of urban households with different income levels changed - from 1.9: 1 in 2005, in 2010 - by 1.28: 1, 2016 - 1.65: 1. This circumstance is caused by a change in the purchasing power of individual social groups.

In our opinion, reduction of this the ratio in 2010 compared to 2005-2016 can be explained by an increase in the level of consumption of pork by the household members of the first group, respectively, by 35% and 32%, and the decrease in the last group of households by 8.8% against the corresponding indicator in 2005 and a slight increase compared to 2016. The main factor is the level of purchasing power of the population, which varied significantly during the period under investigation. So, low-income people in 2010, with increasing purchasing power, had the opportunity to buy relatively more pork, and with a higher level, they reoriented on consumption of substitute products: beef, fish, etc.

In order to determine the impact of household incomes on the level of consumption of pork, we calculated the coefficient of elasticity (Table 2). The value of this factor is high, with the exception of the last group of consumers. The highest value of the coefficient of elasticity was recorded in the population with a income level of 1001-1250 UAH / month, the lowest was -0.151 in the group with an income level of 5001-6000 UAH / month.

Table 2 **Calculation of the coefficient of elasticity of consumption of pork depending on the level of consumer income, 2016**

Groups by average per capita income per month, UAH	Total aggregate resources, ths. UAH / year	Actual consumption of pork, kg	Estimated consumption level	Derivative	Coefficient of elasticity
till 500	5,089	2,51	4,0	0,5904	0,751
501-750	7,849	5,22	5,6	0,5711	0,800
751–1000	10,687	8,06	7,2	0,5512	0,819
1001–1250	13,615	9,04	8,8	0,5307	0,823
1251–1500	16,500	11,17	10,3	0,5105	0,819
1501–1750	19,388	11,86	11,7	0,4903	0,811
1751–2000	22,479	13,89	13,2	0,4686	0,798
2001–2250	25,434	15,44	14,6	0,4480	0,782
2251–2500	28,414	16,62	15,9	0,4271	0,765
2501–2750	31,336	17,18	17,1	0,4067	0,746

Groups by average per capita income per month, UAH	Total aggregate resources, ths. UAH / year	Actual consumption of pork, kg	Estimated consumption level	Derivative	Coefficient of elasticity
2751–3000	34,428	17,61	18,3	0,3850	0,724
3001–3250	37,362	21,28	19,4	0,3645	0,702
3251–3500	40,419	18,42	20,5	0,3431	0,677
3501–3750	43,632	17,67	21,6	0,3206	0,649
3751–4000	46,334	21,24	22,4	0,3017	0,624
4001–4250	49,398	24,98	23,3	0,2802	0,594
4251–4500	52,568	22,95	24,1	0,2580	0,562
4501–5000	56,629	26,65	25,1	0,2296	0,517
5001–6000	64,277	28,44	26,7	0,1761	0,424
over 6000	95,889	28,49	28,8	-0,0452	-0,151
Total	21,125	12,64	12,6	0,4781	0,804

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The given calculations allow to reveal the regularity that with the increase of the level of incomes of consumers the coefficient of elasticity decreases, which is quite obvious and indicates the reorientation of consumers to other types of meat products when changing their purchasing power.

Consequently, the results of the study indicate that pork is a food supply for high-income households in both urban and rural areas. The proof of this conclusion is the significance of the calculated variability of the consumption of pork.

The manifestations of the signs of the economic crisis in the country are growing volumes of sales of fat and the price of high quality pork is reduced. Potential consumers make stocks of those slaughtering pigs that can be stored for a long time. In such a situation in the country, the purchasing power of the population is low, it does not visit public catering establishments, which accordingly leads to a decrease in the consumption of high quality pork. [5]

During 2005-2016 there is a gradual decrease in the level of consumption of fat in general for all categories of households. Thus, in 2016, it increased in the first and tenth groups of households, due to a decrease in purchasing power of the population and the lack of prerequisites for lower food prices.

During the investigated period, there was a significant difference between the levels of consumption of fat and urban and rural households. Thus, in the given

period, the consumption of bacon was higher in rural households compared to urban ones, due to the difference in purchasing power levels and the specifics of fat as a product of long-term storage and high energy value, which, in the use of manual labor, is a source of energy for a rural dweller.

In our opinion, the main factor affecting the relation between households is the volatility of purchasing power of the population of cities and rural areas. During 2005-2010 this ratio was 1: 1,2, in 2016 - 1: 1,3.

At the same time, in the years 2005 and 2016, in the 1-4 groups of households, the ratio of consumption remained almost unchanged, indicating a similarity of consumer preferences in the use of fat by the urban and rural population with low incomes. However, in 5-10 groups of households in 2016, compared to 2005, the proportion in the consumption of fat by rural and urban households has increased, indicating a change in the priority of choosing meat consumption and the role of a personal economy in providing food. The share of fat consumed by members of rural households in 2016, coming from a personal auxiliary farm, amounted to 21-30%, at the same time in urban - 0,9-2,3% (Table 3).

An important element in forecasting consumer demand for any type of food, including lard, is the calculation of demand elasticity indicators, depending on the level of income (Figure 1).

According to the calculations of the elasticity of the consumption of fat depending on the level of income of the population, the demand is inelastic. Correlation-regression equation of dependence of consumption of fat on total resources of population has the following form: urban households - $y = -0,002x^2 + 0,2171x + 3,0733$. According to statistics, the average aggregate income in households in Ukraine in 2016 amounted to 21,125 thousand UAH, while the estimated level of consumption of eats per 1 person is 8.55 kg (in fact - 6.2 kg). The calculated value of the coefficient $R^2 = 0,5977$ indicates that 59.77% of the consumption of fat depends on the level of the per capita income level of the population.

Figure 1 **Correlation-regression equation of dependence of consumption of baconper capita incomes, 2016**
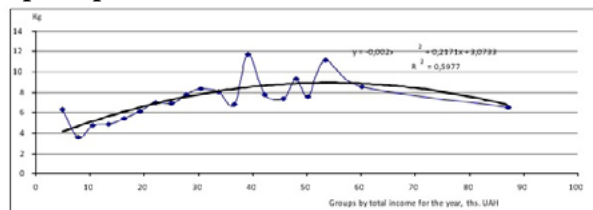
Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

Table 3 **The dynamics of household fat consumption in Ukraine**

| Group | 2005 | | | 2010 | | | 2016 | | | 2016. in % to | | | | | |
| | | | | | | | | | | 2005 | | | 2010 р. | | |
	Total	Town	Village	Total	Town	Village	Total	Town	Village	Total	Town	Village	Total	Town	Village
1	4,2	4,2	4,3	6,0	5,7	6,3	4,6	4,3	5,0	109,5	102,4	116,3	76,7	75,4	79,4
2	5,4	4,9	6,1	6,0	5,4	7,0	4,8	4,5	5,4	88,9	91,8	88,5	80,0	83,3	77,1
3	6,4	6,3	6,7	6,9	6,5	7,9	5,5	5,1	6,2	85,9	81,0	92,5	79,7	78,5	78,5
4	7,2	6,6	8,3	7,6	6,9	9,2	6,2	5,7	6,9	86,1	86,4	83,1	81,6	82,6	75,0
5	7,9	7,5	8,6	8,3	7,4	10,0	7,0	6,2	8,8	88,6	82,7	102,3	84,3	83,8	88,0
6	8,2	7,3	10,2	8,2	7,6	9,9	7,3	6,1	9,8	89,0	83,6	96,1	89,0	80,3	99,0
7	8,8	8,3	9,8	7,8	7,5	9,0	8,3	7,3	10,3	94,3	88,0	105,1	106,4	97,3	114,4
8	8,5	7,2	12,0	8,2	7,5	11,5	8,8	7,4	13,9	103,5	102,8	115,8	107,3	98,7	120,9
9	7,7	6,6	10,9	8,5	8,2	10,0	7,6	6,2	12,0	98,7	93,9	110,1	89,4	75,6	120,0
10	9,1	8,0	12,9	7,8	7,3	11,8	8,5	7,1	13,6	93,4	88,8	105,4	109,0	97,3	115,3
Total	6,8	6,4	7,7	7,3	6,8	8,4	6,2	5,6	7,3	91,2	87,5	94,8	84,9	82,4	86,9

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

It was established that favorable conditions in the pork market were in favor of bacon and offal and decreased on pork. As the main reason we should consider the decline in living standards of the population. Obviously, the subjects of management immediately responded to this situation: they were reorienting to growing and fattening sebaceous pigs.

This is confirmed by a poll conducted by the meat traders in the Khmelnitsky retail food market as of 06.12.2016. Almost all of them replied that today the greatest demand is for fat, meat of poor quality, as well as by-products of the first category. It should be noted that in December 2011, in the retail food markets of Ukraine, the ratio of the price of bacon to the cost of pork was 1:72, and in 2016 - 1: 1.23. That is, there is a process of equalizing prices for the main slaughter products, which is a reflection of demand for them.

During 2011-2016, the decrease in sales of pork was detected by 15% and, accordingly, the growth of sales of lard by 12%.

Regarding the seasonality of retail sales of pork and lard, there is a slight increase in demand in the winter and in May-June. However, significant seasonal fluctuations have not been observed, which is due to some degree of minimization of the influence of religious factor. So, the coefficient of variation in consumption of pork is 0.3-0.35, which testifies to uniformity of consumption regardless of season (Table 4). Confirmation of these calculations is the results of surveys of residents of the Kiev and Khmelnytsky regions, conducted by the author in 2013-2016. Only a quarter of those polled (24.5%) are planning to follow the rules and regulations of the Great Lent, with the share of those who intend to keep fast for all the rules for seven weeks is only 2.8%. This circumstance is evidence of a departure from the rules and rules laid down in the tradition of nutrition.

We believe that this circumstance is predetermined, first of all, by a low living standard of the population, which as a result does not have the ability to purchase sufficient quantities of substitute products during the post period in order to balance the diet in terms of caloric content and nutrient content. It is obvious that, provided that consumption of food accounts for about 55% of total household expenditures, the issue of food diversification is inappropriate. It should be noted that low purchasing power also determines the minimum consumption of meat products by the population, mostly of low quality.

The absence of significant seasonal fluctuations indicates the minimum set of food consumed during the year by the population. The orientation of the formation of a diet based on carbohydrate and vegetable fats with a simultaneous reduction in consumption of other food products is evidence of the imbalance of food in the population, which is trying to secure its energy needs at the expense of economically accessible products.

Table 4 Volumes of sale of lard and pork on the retail food markets of Ukrainian cities and their price correlation

Month	2011				2012				2014				2016			
	Volume of sale of pork, c	Volumes of sales of lard, c	Correlation volumes	Correlation prices	Volume of sale of pork, c	Volumes of sales of lard, c	Correlation volumes	Correlation prices	Volume of sale of pork, c	Volumes of sales of lard, c	Correlation volumes	Correlation prices	Volume of sale of pork, c	Volumes of sales of lard, c	Correlation volumes	Correlation prices
January	28609	13589	2,11:1	2,05:1	28025	12883	2,18:1	1,85:1	28810	18564	1,55:1	1,56:1	31461	18248	1,72:1	1,61:1
February	30524	14915	2,05:1	2,46:1	27304	12604	2,17:1	1,81:1	27604	13108	2,11:1	1,58:1	25948	12072	2,15:1	1,59:1
March	29401	14338	2,05:1	2,52:1	27244	12339	2,21:1	1,75:1	26209	12573	2,08:1	1,59:1	25344	11881	2,13:1	1,57:1
April	35596	17694	2,01:1	2,61:1	30755	26842	1,15:1	1,96:1	28018	23863	1,17:1	1,81:1	26561	24507	1,08:1	1,86:1
May	29485	13752	2,14:1	2,66:1	33200	21082	1,57:1	1,95:1	32968	22284	1,48:1	1,87:1	29342	20412	1,44:1	1,90:1
June	31241	14904	2,10:1	2,57:1	35646	23638	1,51:1	1,85:1	35076	23473	1,49:1	1,78:1	24167	21384	1,13:1	1,84:1
July	29287	13963	2,10:1	2,41:1	31923	19827	1,61:1	1,79:1	30997	19331	1,60:1	1,75:1	26781	17707	1,51:1	1,83:1
August	28691	13824	2,08:1	2,13:1	29322	17073	1,72:1	1,76:1	28911	17090	1,69:1	1,81:1	23042	14407	1,60:1	1,88:1
September	28998	13488	2,15:1	1,89:1	29172	15997	1,82:1	1,61:1	29084	15853	1,83:1	1,70:1	23325	13110	1,78:1	1,73:1
October	29261	13798	2,12:1	1,74:1	29788	16295	1,83:1	1,49:1	28805	15480	1,86:1	1,60:1	23130	13375	1,73:1	1,53:1
November	29715	14127	2,10:1	1,67:1	30428	16585	1,83:1	1,45:1	29667	15905	1,87:1	1,57:1	24713	13710	1,80:1	1,45:1
December	30928	14794	2,09:1	1,72:1	32010	17886	1,79:1	1,55:1	28873	15793	1,83:1	1,33:1	23705	13266	1,79:1	1,23:1
Total	361736	173186	2,09:1	2,20:1	364817	213051	1,71:1	1,74:1	355022	213317	1,66:1	1,66:1	307519	194079	1,58:1	1,67:1

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

4   Conclusions

Calculated coefficients of elasticity of consumption of pork indicate that with an increase in consumer income, the coefficient of elasticity is reduced, which is quite obvious and is a confirmation of the reorientation of consumers to other types of meat products when changing their purchasing power. Pork is proven to be a food for high-income households, both in urban and rural areas, as evidenced by the value of calculated variability of pork consumption.

The specificity of consumption of pork and fat is determined on the basis of purchasing power fluctuations of the population of cities and rural areas. Thus, during the period of 2005-2010 this ratio was 1: 1,2, in 2014 - 1: 1,3, while in 2005 and 2016 in 1-4 groups of households remained almost unchanged, confirms similarity the priorities of low-income urban and rural populations.

Calculations of the elasticity of the consumption of fat depending on the level of income of the population made it possible to establish that demand is inelastic. The calculated level of consumption of eats per person is 8.55 kg (in fact - 6.2 kg), calculated value of coefficient R^2 = 0.5977 indicates that 59.77% of consumption of fat depends on the level of per capita income of the population. It is evident that the level of prices for interchangeable products, such as pork, beef, poultry and other types of meat, is also influenced by the consumption of bacon, in addition to consumer income.

Thus, the main consumer of pork is the population with low and average levels of total incomes, and fat - mostly low. In the context of growing crisis phenomena in the country, the consumption of bacon and low-pork pork is increasing, which is reflected in the respective price ratio between them, while consumers are oriented towards self-sufficiency of pig slaughter products at the expense of a private peasant farm and close family ties. At the same time, in a low income level, demand for low-grade sausages and meat products based on pork will increase.

Consequently, the favorable situation in the pork market was in favor of lard and by-products and decreased on pork, so the subjects of management immediately turned to growing and fattening sebaceous pigs.

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CONSUMER'S TEMPERAMENT AS DETERMINING FACTOR IN PERCEPTION OF EMOTIONAL CONTENT OF ADVERTISEMENT

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Abstract

From psychological research and behavioral economics research is clear that emotions are an integral part of decision making because decision making is also an emotional process. Emotions and current emotional state greatly influence decision-making at each stage of the decision-making process and may be the cause of choosing a particular alternative. Today we know that the consumer is not always rational and does not carefully evaluate all available alternatives before purchase. Consumer decides emotionally, based on feelings and moods, in the context of different situations, according to his own personality. Since personality traits are predominantly inherent and personality is a relatively stable structure, the influence of personality traits on behavior and decision-making suggests the effects of subconscious influences. The aim of the paper is to refer how is the high-positively emotional content perceived by consumers with different personality structures and temperament.It outlines the results of the first year of the research project VEGA 1/0502/17 "Consumer personality and its impact on emotional behavior and decision making".

Our target research group consisted of respondents called "Generations Y" that comprises consumers born approximately from 1977 to 1998, also known as "Millennials" (Children of Millennium). For the purposes of this paper, we consider Generation Y as consumers from 19 to 40 years of age. Total number of survey

respondents was 176, of whom 86 were men and 90 were women. We have used two important research methods: NEO Five-Factor Inventory that measures the individual's level of five personality traits: openness to experience, conscientiousness, extroversion, agreeableness and neuroticism (OCEAN), and Semantic Differential to survey how consumers subjectively perceive selected concepts related to the presented audiovisual advertisement.

Results of our survey proved that consumers of "Generation Y" with higher neuroticism and consumers of "Generation Y" with more emotional temperament react more sensitively to emotional stimuli in a particular audiovisual advertisement.

Keywords: Consumer´s Temperament, Generation Y, Perception, Emotional Content, Advertisement

JEL Classification: *M31, M32, M39*

1 Introduction

Consumer behavior refers to the study of buying tendencies of consumers (Nagyová et al., 2017). There are several stages a consumer goes through before he finally picks up products available in the market. Various factors, be it cultural, social, personal or psychological influence the buying decision of individuals. It is really important for marketers to understand what prompts a consumer to purchase a particular product and what stops him from buying.

To understand a buyer needs and convert them into customers is the main purpose of the consumer behavior study (Bulanda et al., 2017). To understand the buyer habits and his priorities, it is required to understand and know the personality of the buyer. Personality signifies the inner psychological characteristics that reflect how a person reacts to his environment. Personality shows the individual choices for various products and brands. It helps the marketers in deciding when and how to promote the product. Personality can be categorized on the basis of individual traits, likes, dislikes etc. Though personality is static, it can change due to major events such as death, birth or marriage and can also change gradually with time. By connecting with the personality characteristics of an individual, a marketer can conveniently formulate marketing strategies (Koprda, 2014).

It is quite difficult to comprehend consumer psychology without having an understanding of the ways individual's process information and make decisions (Polakevičová, 2015). Extensive research of consumer psychology highlighted the underlying aspects of individuals that make up consumer engagement.

This thesis combines psychological theories and marketing strategies to bring together the main ideas of consumer psychology. The fundamental elements

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accentuated in the theoretical framework are: Internal influences, which consists of perception, attention and interpretation. These topics cover an imperative role in explaining the dimensions of the perceptual process and the effect of marketing stimulus (Zhang & Wang, 2009).

Traits are the features of an individual or tendency of an individual in a particular manner. Traits help in defining the behavior of consumers. According to the Trait theorists, an individual's personality make-up stems out of the traits that he possesses, and the identification of traits is important. Few of the most common traits are: outgoing, sad, stable, serious, relaxed, self -assured. Practical and imaginative. Trait theory is representative of multi-personality theories. Trait theory is based on certain assumptions, such as traits which are certainly stable in nature and a limited number of traits are common to most of the people (Rybanská, 2015).

Personality of a consumer drives an individual's behavior to accomplish their goals in different situations (Géci, 2017) Analysts are able to look at personality as a variable to help predict the effects of individual traits on purchase and consumer behavior. (Engel, et al. 1995). These differences enable marketers to provide a clear understanding of the characteristics consumers possess that are more determinant of behavior (Horská et al., 2017).

It is a difficult task to achieve as every individual is so different, so in order for marketers to be effective they must create advertisements that have a strong appeal to consumers and allow them to think, "What product fits in well with my values, personality and lifestyle" (Engel, et al. 1995).

Personality can be defined as "consistent responses to environmental stimuli" (Kassarjian, 1971). In other words, it is a person's characteristic response tendencies that are repeated in similar situations. The manner in which a consumer responds to environmental stimuli is subject to an individual's psychological makeup. No two consumers are the same, they may have equal tension reduction but their levels in extroversion can be different which can lead them to engage in dissimilar behaviors.

The most useful theories based on personality that are important for marketers to be aware of are trait theories (Hawkins & Mothersbaugh, 2010). Trait theories allow marketers to segment consumers based on personality differences. This theory proposes that an individual's personality is made up of pre-dispositional attributes called traits. "A trait can be defined as a distinguishable way in which an individual can be differentiated from another" (Engel, et al. 1995). Marketers find traits such as risk taking and self- consciousness useful when planning strategies (Andocsová et al., 2017). These three assumptions describe the trait theory, the first is that all consumers have traits that are different from others that

allows marketers to segment consumer markets. Secondly, these traits are stable throughout an individual's lifetime and finally traits can be gathered from the measurement of behavioral signs (Hawkins & Mothersbaugh, 2010).

There are many different dimensions of this trait theory in existence, a common theory for marketers is called the Five Factor Model, which is a multi-trait personality theory. It is the most commonly used multi-trait approach which attempts to capture a significant amount of a consumer's personality using 5 different attributes.

The purpose of this model is to identify five basic traits that are formed through genetics and early childhood learning.

Table 1 **Five Factor Model of Personality**

Core trait	Manifestation
Extroversion	Prefer to be in a group than alone, talkative, bold
Instability	Moody, temperamental, touchy
Agreeableness	Sympathetic, kind, polite
Openness to experience	Imaginative, appreciative of art, find novel solutions
Conscientiousness	Careful, precise, efficient

Source: Hawkins & Mothersbaugh. (2010). Consumer behavior: Building marketing strategy.

As seen in Table 1 above there are five core traits that manifest themselves in certain behaviors caused by different situations. This model has been useful in the way it has improved the understanding of behaviors such as bargaining, complaining and obsessive shopping. (Mowen & Spears, 1999). The advantage that the Multi-Approach model brings is increased knowledge of the determinants of different behaviors, as the saying goes, "the more you know, the better you can satisfy the consumer".

Another theory that focuses more on one single aspect of a consumer's personality is called the Single Trait approach. It is used in order to identify a limited part of consumer behavior, more so consumption related behaviors. Personality traits are closely related to motivation and can be the cause of certain behaviors (Yan, 2014).

There are three traits that are labelled as "needs" which are related to consumer behavior that are called, "Consumer Ethnocentrism, Need for Cognition and need for Uniqueness". (Hawkins & Mothersbaugh, 2010).

Consumer Ethnocentrism describes an individual's ability to create a bias opinion of the purchasing of foreign products (Šugrová et al., 2017). This can occur in consumers who are conservative and less open-minded about other cultural goods (Nagyová et al., 2016). Need for Cognition describes the levels of engagement and thinking that consumers enjoy in different situations. (Hawkins & Mothersbaugh, 2010). Individuals that have a high inclination for Cognition tend to enjoy processing information that is verbal rather than visual. Research made on (NFC) proved that women had higher levels of Need for Cognition than men, which is significant for media targeting (Garber et al., 2003). Moving on to "Need for Uniqueness", which describes individual differences in terms of the inclination to be different from others. To a certain individual, the uniqueness of a product is what draws their attention to the product regardless of whether the product is trendy, good quality or pricey (Predanocyová, 2017). Emotions play a major role in the consumption of products and if a brand produces advertisements that receive positive emotion it is likely that the product will gain consumer satisfaction and brand loyalty (Košičiarová et al., 2017).

Emotions can be defined as strong, uncontrollable feelings that have effect on behavior. (Bagozzi, Gopinath & Nyer, 1999) Emotions are closely associated to motivation and personality which makes emotions highly individual. If consumer needs are not attained, it often leads to negative emotions, causing anger, frustration or irritation however if a consumer's needs are attained this can lead to positive emotions such as happiness, excitement and contentment. It can be seen as a simple notion yet it is so often overlooked in advertisements that are poorly constructed.

Consumers that are considered more emotional than others are affected by an increased amount of affect intensity (Kubicová & Kádeková, 2016). There are common elements involved in emotional experiences, these include emotions that are triggered by the environment, psychological changes such as pupil dilation and cognitive thought which is the ability to think rationally. Another component that is connected to emotion is behavior (Yi & Baumgarter, 2004).

The final component of emotion is "subjective feelings", which is the labels we attach to generic emotions such as happiness, sadness, anger and so forth. A specific "emotion" is seen to be an identifiable feeling and "affect" is seen to be the aspect of satisfaction or dissatisfaction (Rybanská et al., 2015).

Emotions play an imperative role in marketing in relation to product advertising and retailing.

Emotions are seen to be the driving force in consumer arousal and retail benefit. There are many brands on the market that aim for consumer emotional arousal through their advertising campaigns and catchy slogans (Wyer et al., 2012).

Conversely, there are products on the market that bring unpleasant arousal that lead to negative emotions such as over counter medications that treat depression and anxiety "When consumer's experience emotions that are negative they can become eager to take part in consumption behaviors that lighten their mood."(Cohen, Tuan & Andrade, 2008).

There are not many people that look for unpleasant arousal when purchasing products so brands that produce products that have the opposite effect are great mood lifters (Šugrová et al. 2016).

These could include personal grooming products which can lead to stress reduction or fitness programs that promote healthy body image and self-esteem. So in a marketer's perspective creating associations between certain products and mood lightening effects will increase the likelihood that consumer's in a bad mood will purchase them (Kubelaková & Šugrová, 2017).

Advertising can often lead to strong emotional arousal, marketers can use this method to engage with consumers regardless of the product they are promoting (Šugrová et al., 2017).

Emotional branding strategy is a common advertising technique that many popular company's use to engage with consumers on a more personal level (Horská & Oremus, 2008).

The study of the influence of personality traits on purchasing behavior and consumer decision-making has so far been handled by very few authors. Verplanken & Herabadi (2001) found a positive correlation between impulsive shopping and extroversion and the negative dependence between impulsive shopping and consciousness. Matzler et al. (2006) confirmed the dependence between extroversion, openness and hedonic value of products. Barkhi & Wallace (2007) found out the significant impact of neuroticism and openness on willingness to buy. Chen (2007) has shown a significant influence of the personality on choosing the food products.

2   Data and Methods

In research is included a research group, which age structure falls into the "Generations Y". Generation Y includes consumers born between 1977 and 1998, and some authors call them "Millenials" (children of the millennium). For the purposes of this paper, we will consider Generation Y as consumers aged 19-40. The selection of surveyed respondents consist of 176 consumers aged 19-40, of whom

86 are men and 90 are women. All respondents have completed secondary education or higher education and residence in the Slovak Republic. 47 men and 50 women live in the city and 39 men and 40 women live in the countryside. These characteristics are given because they are necessary to verify the representativeness of the sample. We do not consider the other characteristics of the sample to be important for our research. The basic set of Generation Y in Slovakia represents 1,797,461 consumers. Further characteristics are given in the Table 2.

Table 2 **Research Group According to Gender and Residence**

		Residence		Total
		City	Countryside	
Gender	Male	47	39	**86**
	Female	50	40	**90**
Total		**97**	**79**	**176**

Source: Authors´ Processing.

The sample's representativeness was verified by a Pearson's chi square test, which tests a zero statistical hypothesis, which asserts that the abilities in each category are equal to the expected (theoretical) abilities. If the p-value is lower than the chosen significance level ($\alpha = 0.05$), we reject the zero hypothesis, which means that the difference between the frequencies found in the sample set and the expected frequencies is statistically significant. If the p-value is equal to or higher than the chosen significance level, we accept a zero hypothesis. In our research, the p-value is 0.49. This means that the sample of respondents is representative of gender and residence.

To evaluate results of our research have been used following research methods: NEO Five-Factor Personality Inventory and Semantic Differential.

NEO, a five-factor personality inventory (from the original NEO Five Factor Inventory) is a personality questionnaire by P. T. Costu and R. R. McCrae from 1992. We have used a revised version. The Slovak edition was published in Prague in 2007. The Slovak manual is the original by I. Ruisel and P. Halama. The inventory is used to diagnose basic personality factors in adolescents from the age of 15 and adults. The inventory identifies the individual's level of five personality traits: neuroticism, extrovertness, openness to experience, consciousness, and friendliness (NEOPS). Based on the scale of extrovert and neuroticism, we can determine the type of temperament of person. Stable extrovert is sanguine, unstable extrovert is choleric, stable introvert is phlegmatic and unstable introvert is melancholic. For each of the five scales we calculated the gross score by adding

the corresponding items (according to the template) and we also determined the temperament of each respondent.

Semantic Differential is a research method for detecting how respondents subjectively perceive the selected concepts related to the presented audiovisual advertisement. The semantic differential is a battery of 7-degree bipolar verbal scales. By using this method, respondents rated our ad.

3   Results and Discussion

Respondents involved in our survey watched the ad "*Coca Cola 2016 Holiday Puffin*" and rated it on a semantic differential scales. We found significant differences based on the personality of the consumer. Consumers are assessed according to gender, predominant temperament and according to level of extrovertness and neuroticism. The representation of NEOPS personality traits in the group of survey respondents is given in Table 3.

Table 3 **Representation of NEOPS Personality Traits in the Group of Survey Respondents**

	N	E	O	P	S
High Rate	58	130	120	146	162
Low Rate	116	43	46	24	10
Unchecked Type	2	3	10	6	4

Source: Authors´ Processing.

Figure 1 **Representation of Predominant Types of Temperament in the Group of Survey Respondents**
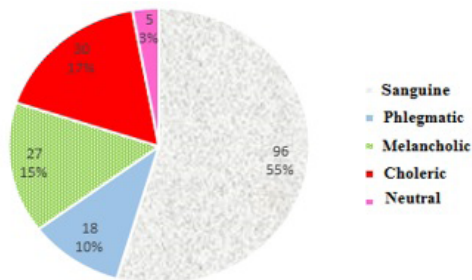
Source: Authors´ Processing.

Representation of predominant types of temperament in the group of survey respondents is offered in Figure 1, where 96 respondents (55%) are sanguine, 30 respondents (17%) are choleric, 27 respondents (15%) are melancholic, 18 respondents (10%) are phlegmatic and 5 respondents (3%) are neutral.

Figure 2 **Semantic Differential- Assessment According to Gender**
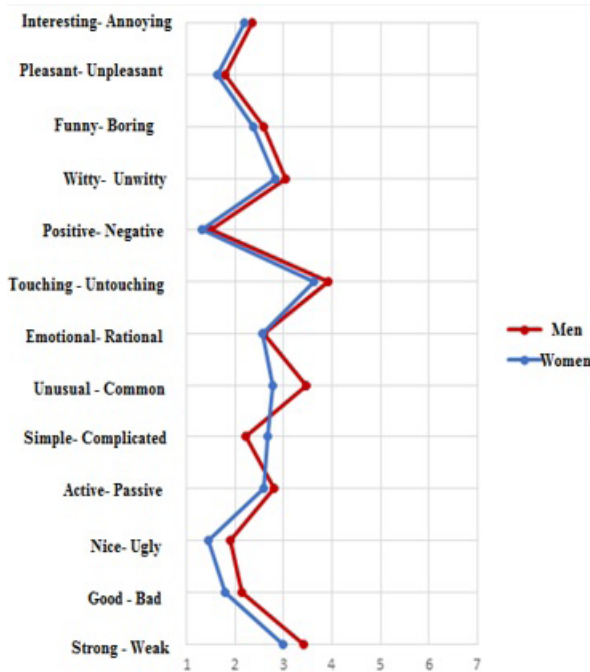
Source: Authors´ Processing.

Figure 2 proved that the ad liked more women than man. Women see it as more complex, unusual, slimmer, better and more powerful. In the other characteristics, there are no significant differences between genders. Advertising is considered as interesting, positive and enjoyable.

Figure 3 **Semantic Differential - Assessment According to Level of Extrover-sion**
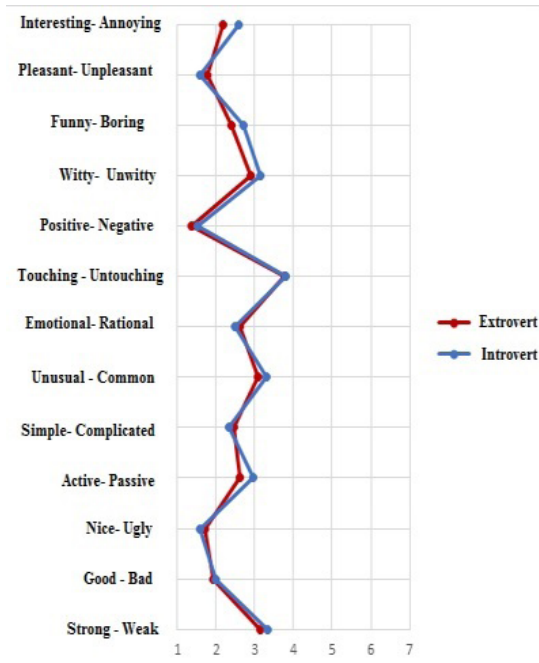
Source: Authors´ Processing.

Figure 3 proves that ad is more interesting, more fun and more active to people with a higher level of extroversion. In the other assessments, respondents with varying level of extroversion almost do not differ.

In Figure 4 we can see that the ad was liked more by respondents with a higher level of neuroticism. They consider it to be nicer, better, stronger, more active, more emotional, more entertaining and more fun. We can see that more emotional consumers are more responsive to emotional appeals in advertising.

In Figure 5 is proved that the ad was the most liked by melancholic and the least by phlegmatic. Melancholic respondents consider it the most beautiful, the best, the most pleasant and the most positive. Phlegmatic respondents consider it as untouching. However in general was given ad rated high positive. And once again, the most emotional consumers evaluate it the most positively

Figure 4 **Semantic Differential - Assessment According to Level of Neuroticism**
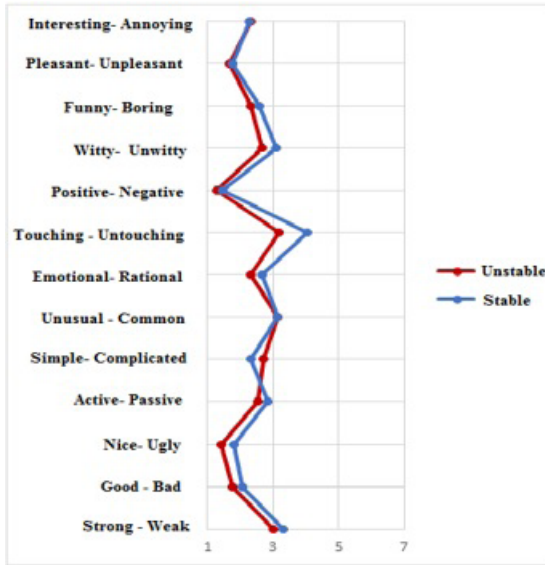
Source: Authors´ Processing.

Figure 5 **Semantic Differential - Assessment According to Prevailing Temperament**
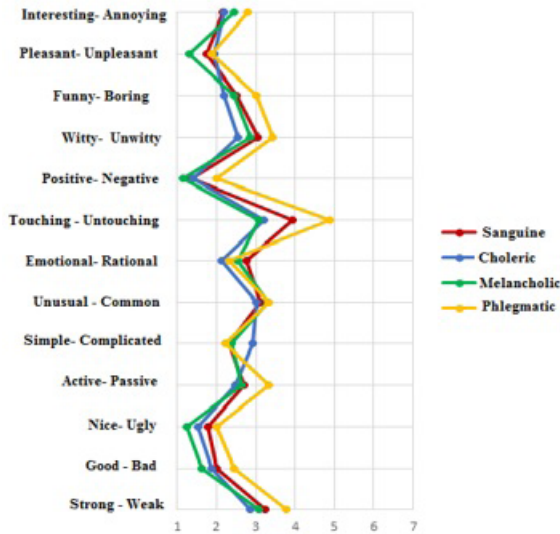
Source: Authors´ Processing.

4   Conclusion

Target research group assessed in the submitted paper were respondents called "Generations Y" also known as "Millennials" (Children of Millennium). For the purposes of this paper, we consider Generation Y as consumers from 19 to 40 years of age, total number of respondent included in survey was 176, of whom 86 were men and 90 were women. We have used two research methods: NEO Five-Factor Inventory and Semantic Differential to survey how consumers subjectively perceive selected concepts related to the presented audiovisual advertisement. Respondents watched the ad "*Coca Cola 2016 Holiday Puffin*"and rated it on a semantic differential scales. Consumers were assessed according to gender, predominant temperament and according to level of extrovertness and neuroticism. We found out significant differences based on the personality of the consumer. Results of our survey proved that consumers of "Generation Y" with higher neuroticism and consumers of "Generation Y" with more emotional temperament react more sensitively to emotional stimuli in a particular audiovisual advertisement.

Acknowledgements

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PREFERENCE AND PERCEPTION OF PRIVATE LABEL PRODUCTS AND YOGHURTS – A CASE STUDY OF SLOVAK CONSUMERS WITH THE AGE UP TO 30 YEARS

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Abstract

There is no doubt that private labels represent a new way how the retailer can build new and loyal customers. What must be mentioned connected with them, is the fact, that many potential customers still doubt about their quality. The market of dairy products and especially of yoghurts is not an exception. The present paper deals with the issue of private labels, their quality and preference from the side of Slovak consumers with the age under 30 years. The aim of the present paper was to determine the preferences of products and yoghurts labelled by the private labels, as well as the perception of their quality from the side of Slovak consumers' with the age under 30 years. As the research methods there were used the methods of survey, structured questionnaire (the total number of respondents was 1,264 randomly selected respondents with the age up to 30 years) and blind test. For a deeper analysis of the obtained results, there were set out six assumptions and nine hypotheses, which were tested with the use of Pearson's chi-square test, Fisher's exact test, Cramer's contingency coefficient and Phi coefficient. The results of the research show, that the situation with the preference and perception of the products and yoghurts labelled by the private label from the side of Slovak consumers with the age under 30 years is very good – 38 % of respondents buy the products labelled by the private label daily, over

42 % of respondents prefer in their purchase products labelled by the private label, more than 79 % of respondents see the quality of products labelled by the private label as adequate to the price, more than 74 % of respondents buy the yoghurts labelled by the private label, more than 58 % of respondents exactly prefer them before the yoghurts labelled with the traditional brand and over 80 % of respondents think that the quality of yoghurts labelled by the private label is very high and high.

Keywords: *private label, yoghurt, preference, Slovak consumerwith age under 30 years*

JEL Classification: *M31, M39*

1   Introduction

The nowadays market place is characterized by a never ending competition for new customers, which can by time become stable and loyal visitors and customers of the proper retail chain. One of the possibilities how to make a loyal customer, is to give him the right product with good quality and a fair price. This, supported by the adequate communication will easily create a strong position for the product on the certain market (Kubicová & Kádeková, 2011; Kretter et al., 2010). Unfortunately, the creation of that position costs something (not just the time, but also money) and producers, but also retailers try to find new ways how to avoid it. This is also why retailers have more interest in products that help them to compete better, either being cheaper or differentiating better (Veraart Research, 2017). One of the ways how to achieve the reduction of time and money is to cooperate with an existing producer and to create a so called private label, which in contrast with the traditional label, which is the property of the exact manufacturer, is the property of given retailer (Nagyová & Košičiarová, 2014).

Private labels, also known as retail brands, store brands, national brands or own brands, are nowadays considered to be a global phenomenon (Smith & Bashaw, 2009), which is widespread all over the world. Despite the fact that their history can be dated back to the year 1880, when The Great Atlantic and Pacific Tea Company (A & P) has marketed its own brand of baking powder (Košičiarová & Nagyová, 2014), the very beginnings of their development were not as easy – since their beginning, they have been seen as the "poorer brothers" of branded products and have achieved only very low marketability of shares (Lincoln & Thomassen, 2008). The reason was were simple – they were seen as replicas, which have imitated the leading brands not just in their packaging, but also in the colours and used font types (Kumar & Steenkamp, 2007). This is, why the history of private labels can be in general divided into three main periods – the period

of price competition in the 70th years, which is also named as the era of generic brands, and for which was typical the increase of competition and emergence of commodity products with a pricing fighters, which's aim was the increase of sales and market shares and increase of customers' price sensibility; the period of competitive differentiation in 80th years associated with the era of own and exclusive brands, as well as with the era of imitation of branded products especially in the view, quality and packaging; and the period of overall corporate image-building in the 90th years, when to the fore front are becoming the own labels and when to the competitive market of private labels entered also the British market and when there was introduced a special type of organic product lines, as well as various health-promoting products and others (www.gov.mb.ca, 2010; Môciková, 2000).

Because of the need to reduce the problems resulting from misapprehension of the issue of private labels, different signs and symbols controlled by retailers were commonly named as private labels and divided into four big groups – generic private labels, copycat store brands, premium store brands and value innovators (Pwc, 2011; Pradhan 2010; Ray, 2010, Kumar and Steenkamp 2007; Štensová et al. 2006; Nagyová 2000).While generic private labels have started as cheap "inferior products", whit lower quality and did not carry the name of the retailer, but the name of the exact product; copycat store brands, have carried the name of the retailer and tent to have packaging and price points very close to the products, which they had compete with; and premium store brands (where the term premium historically referred mainly to the contrast with the copycat brands rather than with the leading manufacturer brands) are said to be superior in price and quality to the traditional brands; value innovators are absolutely different kind of private labels, where the retailers following this approach have to focus on cutting down costs and processes to simplify the production and marketing of product ranges, so that a good quality product could be offered at very low prices (there are a number of key principles, which must be adhered to become successful – limited number of products, low costs of production and marketing and good quality products at low prices).

The strategy of foreign, but also of domestic retail chains is to reach all groups of customers – to satisfy not just the price sensitive customers, but also those who prefer the high quality goods. The mentioned requirements have to be met by the private label products, whose share in Europe, but especially in Slovak Republic, continues to grow – the data compiled for PLMA's 2016 International Private Label Yearbook shows that the market share for private labels increased in 13 of the 20 European countries (Figure 1). The extraordinary progress was recorded exactly in Central and Eastern Europe – volume share has climbed above 30 %

in the case of Czech Republic, Hungary and Slovak Republic, while in the case of Poland is it four times higher as in the year 2003 (plmainternational.com, 2017).

Figure 1 **Private label share by country**

Source: Private Labels´ market share climbs in 13 of 20 countries across Europe. 2017. Retrieved from http://www.plmainternational.com/industry-news/private-label-today.

To the speed and penetration rate of private labels in Europe compared to the US, helps mainly the interest from the side of shoppers and the inventiveness of retail chains that appear in private brand much more than just another product that conceals their margin (Augustín, 2005). Private labels imply several benefits – not just on the side of the consumer, but also on the side of the trader and to some extent on the side of supplier. They help in increasing the sales volume, economies of scale, lower costs on communication and logistics, and bring the opportunity to input new markets (Machková, 2009). While for the consumer is the main advantage the lower price, for the retailer is it the possibility to enhance the image, increase of supply and demand, enhance of customer loyalty, as well as the minimization of the risks associated with the introduction of new products (Shapiro, 2016; Cross, 2016; Liu & Wang, 2008; Cheng et al., 2007; Huang et al., 2007; Sethuraman & Cole, 1999; Baltas et al., 1997). As the other possible benefits of private labels for retail could be mentioned not just the reduction in advertising costs and the possibility of determining its own pricing policy, but also the ability and flexibility to change the search and producers, as well as the opportunity to achieve higher margins (Kokemuller, 2014; Machková, 2009; Horská, 2007).

Milk presents a perfect and at same time the most natural beverage with which the human beings meet immediately after their birth and which they use in different forms through round their lives. It is important not just to mention that milk and dairy products are an important source of essential nutrients, including several deficient (especially, in baby food, such as Vitamin D, calcium, and magnesium) (Nicklas, 2009), but also that they can be unquestionably considered as products that maintain the good health, as the prevention of certain diseases, as well as the support for their treatment (Habánová, 2010). The average contribution of dairy products to nutrient intakes in adults in European countries up to the survey of eight Member States says that it is 52 % of calcium, 83 % of vitamin B2, 32 % of vitamin B12, 29 % of phosphorus, 26 % of iodine and 20 % of protein (Eda, 2016). Despite the fact that the consumption of milk and dairy products has in Slovak Republic a long tradition (the history of manufacturing of dairy products is in Slovak Republic more than 100 years old), the nowadays trend shows, that there is a permanent decline in it – while in 1989, Czechoslovakia consumed 260 kg of milk per person and had 166 dairies which were centrally managed, after joining the EU, in the Slovak Republic there was allocated a milk quota for milk production, which was set at the level of 1,061.6 mil.kg in 2009/2010 (Kubicová & Habánová., 2012) and further increased to the level of 1,115.6 mil.kg in 2014/2015 (Kubicová et al., 2014). Finally, after five years of a preparatory increase in their level, milk quotas have disappeared on 1th April 2015 (eurostat, 2015). Unfortunately, while the recommended consumption of milk is set on the level of 220/kg/person/year, the reality in the Slovak republic is nowadays only 160 kg/person/year. After the year 1989 is in the Slovak Republic recorded a sharp drop in the consumption of milk and dairy products, despite improving conditions of production and supply – constantly expanding range of milks and dairy products, development of business networks and high availability of these products across the country. Between the years 1990 and 2000, the consumption of milk and dairy products per capita/year decreased by 80 kg (from 240 kg/person/year to 160 kg/person/year) and the sharpest decline occurred while between the years 1989 and 1993, by which the consumption is more or less stabilized at the level of 160 kg/person/year (Karabová, 2016).

One of the possibilities how to reverse this negative trend is to bring the Slovak consumers to buy and consume more dairy products, especially yoghurts, which are globally the most widespread and most popular fermented milk products, which are well tolerated also by lactose sensitive people (Kubicová & Kádeková, 2013) and which consumption is on the up around the globe, driven by three major food trends – the health, convenience respectively snacking and protein (foodstuffsa.co.za, 2015). Yoghurt is produced exactly when milk (usually the

cow's milk) is fermented with Lactobacillus bulgaricus and Streptococcus thermophilus under defined conditions of time and temperature (Komai, 1992). Its history can be dated back to ancient times, when it is said that the first yoghurt was originally prepared from sheep and buffalo milk and partly from goat and cow once. It was used in the human nutrition for direct consumption and later it was amended with other ingredients such as vegetables, fruits, spices and used for cooking and baking (Šulcerová, 2007). The first industrially prepared yoghurt was produced by the Danone company in the year 1922 and the development of its production can be dated after the World War II (Snášelová, 1999). Nowadays the market of yoghurts is characterized by a huge amount of different kinds and sorts of yogurts which are aimed not just at their core function (serving as a kind of food), but they provide also other added functions, e.g. the loss of weight, improvement of the digestion etd. The second possibility how to reverse the negative trends in the consumption of milk and milk products is to reduce the price of yoghurts, by what they will become more interesting for price sensitive consumers and the third possibility is to combine the previous two possibilities especially by the promotion and support of sale and consumption of yoghurts labelled by the private label because their price is lower, but their quality is the same one as of the traditional yoghurts. This is why the present paper deals with the issue of products and yoghurts labelled by the private label, their quality and preference from the side of Slovak consumers (focusing on the age under 30 years) what can serve as a helping point of marketers and producers, to know, how the Slovak consumers behave on the market of these products, what leads and discourages them from their purchase, as well as how they see their quality.

2   Data and Methods

The aim of the present paper was to determine the preferences of products and yoghurts labelled by the private labels, as well as the perception of their quality from the side of Slovak consumers' under the age of 30 years. In order to achieve the formulated aim, as research methods, there were used the methods of survey, structured questionnaire consisting of 15 questions formulated as closed, so that respondents (total number of respondents was 1,264 randomly selected respondents, from all over the Slovak republic, with the age up to 30 years, Table 1) had the possibility to choose one, or alternatively more options, and the method of blind test. The focus group (respondents with the age up to 30 years) was chosen up to the results of authors' previous works and findings – Nagyová & Košičiarová (2014), Košičiarová & Nagyová (2014), Košičiarová et al (2014) – where they have

realised, that private label products are mostly bought by young people, students, retired and women on the maternity leave.

Table 1 **Characteristics of respondents**

Category of respondents	Number	Place of living	Number
Male **Female**	499 764	City Village	798 465
Economic activity of respondents	**Number**	**Educational structure of respondents**	**Number**
Employed **Unemployed** **Student** **On maternity leave**	678 60 395 130	Primary education Secondary education without A level Secondary education Higher education	60 143 590 470

Source: Results of the research.

The questionnaire was evaluated with the use of contingency tables, which were prepared by Excel, under which they were subsequently developed graphic representations. For a deeper analysis of the obtained results, there have been set out the following assumptions:

- assumption no.1 – our respondents prefer in their purchase products labelled by the private label;
- assumption no 2 – our respondents see the quality of private label products as comparable with the quality of traditional label products;
- assumption no.3 – the most important factor which discourages our respondents from the purchase of private label products is their packaging;
- assumption no.4 – our respondents prefer in their purchase yoghurts labelled by the private label;
- assumption no. 5 – the most important factor leading to the purchase of yoghurts labelled by the private label is their quality;
- assumption no. 6 – our respondents prefer in their purchase the chocolate taste of yoghurts labelled by the private label;

and the following hypotheses:

1. H_{01} – there does not exist the dependence between the frequency of purchase and the respondents' gender.
2. H_{02} – there does not exist the dependence between the frequency of purchase and the respondents' economic activity.

3. H_{03} – there does not exist the dependence between the factors leading to the purchase of private label products and the respondents' gender.
4. H_{04} – there does not exist the dependence between the factors leading to the purchase of private label products and the respondents' education.
5. H_{05} – there does not exist the dependence between the factors discouraging from the purchase of private label products and the respondents' gender.
6. H_{05} – there does not exist the dependence between the factors discouraging from the purchase of private label products and the respondents' education.
7. H_{07} – there does not exist the dependence between the frequency of purchase of yoghurts labelled by the private label and the respondents' gender.
8. H_{08} – there does not exist the dependence between the frequency of purchase of yoghurts labelled by the private label and the respondents' economic activity.
9. H_{09} – there does not exist the dependence between the frequency of purchase and the respondents' economic activity.

To test the formulated dependences, there were used the methods of Pearson's chi-square test, Fisher's exact test, Cramer's contingency coefficient and Phi coefficient, which have been counted in the statistical program IBM SPSS Statistics. Because of the need to determine the quality of yoghurts labelled by the private label, better said the perception of their quality from the side of Slovak consumers' under the age of 30 years, the blind test on the sample of 100 randomly selected respondents was done. The respondents had the possibility to taste four different kinds of yoghurts – a of creamy yoghurt produced by a traditional producer who sells this yoghurt under his brand and three other creamy yoghurts sold under three different private labels. The respondents had to evaluate the mentioned yoghurts up to taste, packaging, consistency, fragrance and colour on the scale 1 – 5 (1 – the best, 5 – the worst).

3   Results and Discussion

As it was mentioned before, private labels and by that the products sold under them are nowadays becoming much more popular not just between the producers and retailers, but also between the consumers. In terms of the establishment of private labels in Slovak Republic, unlike the US and many European countries, it can be stated that even if these labels have penetrated to our market much later (in the second half of the 90s of the 20th century), their penetration was more successful – their introduction was associated with the entry of foreign retail chains on the Slovak market to its business strategy on retail brands used in their home

countries or branches located in different parts of the world (Nagyová & Košičia-rová, 2014). The reason is very simple – these products are in many cases cheaper and at the same time in terms of their quality comparable to the products sold under traditional labels. The traditional yoghurts but also the yoghurts labelled by the private label produced and sold in Slovak Republic are not an exception. The present days are characterized by the increasing trend of private label products in retail chains in Slovak Republic but also in the world, by what the introduction of products under private label becomes almost a necessity. Consumers do not have only a high awareness of private labels, but they give them more space in their shopping cart. On the rise is also the trust to the quality of these products, which also corresponds to the growth in the share of private labels on the retail chains' turnover. Therefore, there is a need to focus more on the quality of these products, so that they should bring to their purchase also those consumers who are still sceptic, or frightened from them (Chebeň & Štefúnová, 2011).

Up to the results of research done by TNS Slovakia on the sample of 1,000 respondents in the age between 18-65 years in 2015, it can be stated that almost every Slovak inhabitant (exactly 98 %) has ever bought a private label product and exactly three quarters of them are buying private label product at least for once in a week (tns-global.sk, 2015). This is why the aim of the present paper was to determine the preferences of products and yoghurts labelled by the private labels, as well as the perception of their quality from the side of Slovak consumers' under the age of 30 years. To obtain the formulated aim, a questionnaire survey was realized in the time period of 1st January 2016 to 1st March 2016. As it can be seen from the Table 1, the majority of our respondents were represented by women (60.5 % or respondents), people living in the city (63.2 % of respondents), people with secondary respectively higher education (46.7 % and 37.2 % of respondents) and employed people (31.3 % of respondents). As it was mentioned in the part Material and Methodology, the focus group was chosen up to the results of authors' previous works and findings, where they have realised, that private label products are mostly bought by young people, students, retired and women on the maternity leave.

Up to the results of our own research, we can stay that the situation with the preference and perception of private label products is by Slovak consumers' under the age of 30 years pretty good – the majority of our respondents (exactly 38.1 % and 35.0 % of respondents) said that they purchase private label products daily, respectively for few times in a week, exactly 42.5 % of respondents prefer the private label products before the traditional label products (assumption no. 1 is true) and exactly 52.4 % of respondents think that while the private label products are characteristic with lower price, their quality is comparable with the traditional

products (assumption no. 2 is true). Connected with the question of frequency of the private label products purchase there has appeared also the question about the dependence respectively independence between the mentioned variable and the respondents' gender, respectively between the mentioned variable and the respondents' economic activity. Both of the formulated hypotheses have been tested with the use of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient. Up to their results we can conclude that while in the case of the first relationship we cannot talk about a dependence, in the case of the second relationship (between the frequency of private label products purchase and the respondents' economic activity) we can talk about a weak but statistically still significant dependence (the result of Cramer's contingency coefficient was equal to 0.082 and the result of Phi coefficient was equal 0.143 what can be interpreted as a very weak relationship) – while employed, unemployed and respondents on maternity leave are purchasing private label products mostly daily, students are buying them mostly for few times in a week.

Because of the need to determine which are the mostly bough categories of private label products, as well as the factors leading and discouraging to and from the purchase of private label products, in the questionnaire were formulated also the questions dealing with this issues. While the results of research done by TNS Slovakia in 2015 have shown that the mostly bought categories of private label products are the paper products, e.g. toilet paper, kitchen towels or handkerchiefs, respectively in the case of food sweets, pasta, non alcoholic drinks, ready meals, semi-finished products and meal and dairy products (tns-global.sk, 2015) and the results of research done by IRi in 2013 in all European countries that these categories are milk and dairy products (61 %), fresh eggs (57 %), cups & plates (56 %), trash bags (54 %), natural cheese (49 %), vitamins (48 %), bottles water (38 %), bread & rolls (36 %), frozen seafood (33 %) and toilet tissues (23 %) (www.preparedfoods.com, 2014), the results of our research have shown that these categories, in the case of people with the age up to 30 years, are the meal and meal products, milk and milk products, sweets, salty snacks and frozen meals (Figure 2). Up to the questions of factors leading and discouraging to and from the purchase of private label products we can conclude that the most important factors leading to their purchase are the quality (39.8 % of respondent), previous experience (27.6 % of respondents) and the price (12.5 % of respondents) and the most important factors discouraging from their purchase are surprisingly again the quality (42.4 % of respondents), packaging (20.3 % of respondents) (assumption no. 3 is partially true), content (16.2 % of respondents) and the lack of information about the exact producer (11.4 % of respondents). The mentioned results are very interesting because up to the question, how do our respondents

see the quality of private label products, exactly 70.1 % of respondents said that they think that the quality of private label products is comparable with the quality of traditional label products, what to some extant confirms also the results of research done by Nielsen on the sample of 30.000 online consumers in 60 countries in 2014, which results show that most of their respondent think that the quality of private label products has improved over the time (71 % of respondents) and that they are a good alternative to the traditional label products (65 % of respondents) (Nielsen, 2014).

Figure 2 **Mostly bought categories of private label products**
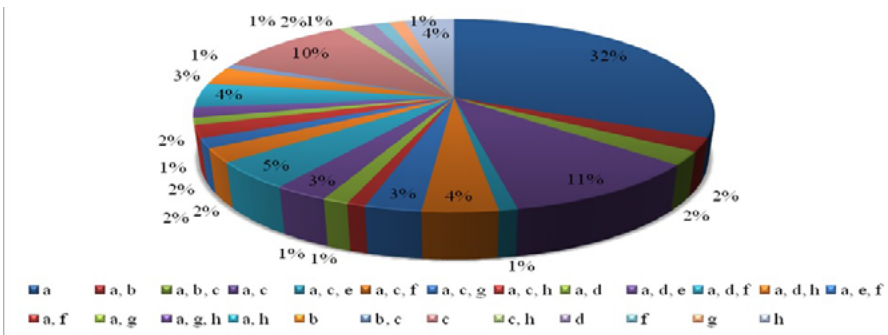
Explanatory notes: a – meal and meal products; b – milk and dairy products; c – sweets; d – salty snacks; e – cans, pastas, sauces; f – non-alcoholic drinks; g – alcoholic drinks; h – frozen meals
Source: Results of the research.

Because of the need to determine, even if there exist a dependence between the factors leading to the purchase of private label products and the respondents' gender, respectively his education, and between the factors discouraging from the purchase of private label products and the respondents' gender, respectively his education, we have formulated the four zero hypotheses connected to the mentioned issues and tested them with the use of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient. From their evaluation is clear that the only relationship which was not confirmed was the relationship between the factors leading to the purchase of private label products and the respondents' gender. In the case of other formulated hypotheses we can talk about very weak, but statistically still significant relationship (the result of Cramer's contingency coefficient was equal to 0.102, 0.108, respectively 0.366 and the result of Phi coefficient was equal 0.176, 0.108, respectively 0.634).

As we have mentioned it before, milk and dairy products represent an important part of human beings nutrition, which is a key source of vitamins, calcium, and other nutritional components. Yoghurts represent the most widespread form of dairy products, which consumption has in Slovak republic very deep roots. This is why the second block of questions formulated in our questionnaire survey was aimed at the purchase, preference and perception of yoghurts labelled with the private label. Up to their evaluation we can conclude, that the situation with the purchase, preference and perception of their quality is between the Slovak consumers' under the age of 30 years very good – exactly 38.1 % of respondents and 36.3 % of respondents purchase them definitely and rather, most of respondents purchase them for few times in a week, respectively for once in a month (exactly 28.1 % a 25 % of respondents), more than the half of respondents prefer them before the traditional yoghurts (29.7 % of respondents prefer them definitely and 28.8 % of respondents prefer them rather) (assumption no. 4 is true), the majority of respondents think that their quality is very high and high (44.1 % of respondents and 36.3 % of respondents have judged the quality of yoghurts labelled with the private label with the value 1 and 2) and exactly 93 % of respondents think that the ratio between the price and the quality of yoghurts labelled with the private label is adequate (40.3 %, 31.0 % and 21.7 % of respondents judged the mentioned ratio with the value 2, 3 and 1). Connected with the question of frequency of purchase of yoghurts labelled by the private label there has again appeared the question about the dependence respectively independence between the mentioned variable and the respondents' gender, respectively between the mentioned variable and the respondents' economic activity. Both of the formulated hypotheses have been tested with the use of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient. Unfortunately in the case of both formulated hypotheses we have to conclude that there does not exist any dependence between the tested variables.

Because of the need to determine, which are the most important factors leading the young respondents to the purchase of yoghurts labelled by the private label, as well as even are the information shown on the packaging of the mentioned products important for the consumers and which flavour they prefer in their purchase, in the questionnaire survey there were also formulated the questions dealing with the mentioned issues. Up to their evaluation we have to conclude, that Slovak consumers' under the age of 30 years are really thinking about the quality of purchased products and they purchase the yoghurts labelled by the private label because their high quality and lower price – the most important factors leading to the purchase of yoghurts labelled by the private label are their quality (40.1 % of respondents) (assumption no.5 is true), price (30 % of respondents)

and packaging (7.7 % of respondents) (Figure 3), 86.8 % of respondents read the information printed on their packaging always and sometimes (43.9 % and 42.8 % of respondents) and the mostly preferred flavours of yoghurts labelled by the private label are the chocolate flavour, white yoghurts and fruit flavour (29.9 %, 17.5 % and 13.1 % of respondents) (assumption no.6 is true). The mentioned results also confirm the results of research done in 2012 which have shown that Slovak consumers consume mostly white yoghurts and 24 % of male and 40 % of female respondents consume yoghurts daily (zdravie, 2012). Because of the need to determine even if there exists a dependence between the preferred flavour of yoghurts labelled by the private label and the respondents' gender we have formulated the zero hypothesis which was tested with the use of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient. Up to its evaluation we can conclude that there again does not exist dependence between the tested variables, which means that women do not prefer more chocolate flavour of yoghurts than the men.

Figure 3 **Factors leading to the purchase of yoghurts labelled by private label**
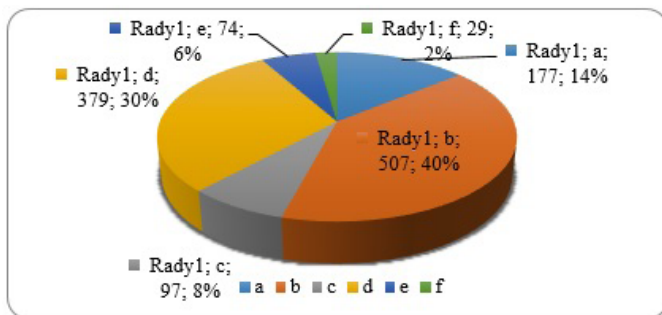
Explanatory notes: a – promotion; b – quality; c – packaging; d – price; e – previous experience; f – recommendations from the family and friends
Source: Results of the research.

Because of the need to determine the quality of yoghurts labelled by the private label, better said the perception of their quality from the side of Slovak consumers' under the age of 30 years, the blind test on the sample of 100 randomly selected respondents was done. The respondents had the possibility to taste four different kinds of yoghurts – a of creamy yoghurt produced by a traditional producer who sells this yoghurt under his brand and three other creamy yoghurts sold under three different private labels. The respondents had to evaluate the mentioned yoghurts up to taste, packaging, consistency, fragrance and colour on

the scale 1 – 5 (1 – the best, 5 – the worst). Up to their evaluation can be concluded that the perception of the quality of private label yoghurts from the side of Slovak consumers' under the age of 30 years is really very good – the differences between the mentioned variables are very small. Up to the taste, consistency, fragrance and colour, it means up to the quality we can conclude that there are small differences, what to some extent confirms also the results of research done Cano_Sancho et al. in 2015. Unfortunately, up to the packaging of yoghurts labelled by the private label there are still big reserves (Figure 4) – most of our respondents still consider the packaging of private label yoghurts as not very interesting and attractive and they want to change them, because now they are mundane and less pronounced.

Figure 4 **Results of the blind test**
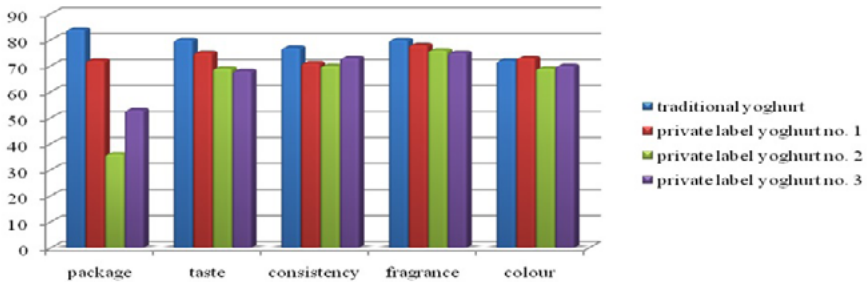
Source: Results of the research.

4   Conclusion

The aim of the present paper was to determine the preferences of products and yoghurts labelled by the private labels, as well as the perception of their quality from the side of Slovak consumers' under the age of 30 years. To obtain the formulated aim, the questionnaire survey was realized in the time period of three months. As the results of the survey shows, the situation with the preference of products and yoghurts labelled by the private labels, as well as the perception of their quality is from the side of Slovak consumers' under the age of 30 years very good:
- more than 38 % of respondents purchase private label products daily and over 42 % of respondents prefer them before traditional label products,
- more than 79 % of respondents see the quality of products labelled by the private label as adequate to the price,

- while the most important factors leading to the purchase of private label products are the price, quality and previous experience, the most important factors discouraging from their purchase are the quality, packaging, content and lack of information about the exact producer,
- over 74 % of respondents purchase the yoghurts labelled by the private label and almost 60 % of respondents exactly prefer them before the traditional yoghurts,
- more than 80 % of respondents think that the quality of yoghurts labelled by the private label is very high and high and exactly 93 % of respondents think that the ratio between the price and the quality of yoghurts labelled with the private label is adequate.

Because of the need to perform a deeper analysis of the given issue, in the present paper, were formulated six assumptions and nine hypothesis, which have been tested with the use of the methods of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient, which have been counted in the statistical program IBM SPSS Statistics. From their evaluation is clear, that while all the assumptions were true, only four hypothesis have proved a weak but statistically still significant dependence between the tested variables – while employed, unemployed and respondents on maternity leave are purchasing private label products mostly daily, students are buying them mostly for few times in a week; while in the case of respondents with secondary education without A level is the most important factor leading them to the purchase of private label products their previous experience, in the case of respondents with other forms of education is the most important factor the quality; while for women is the less discouraging factor in their purchase of private label products the price, for men is it the lack of information about the exact producer; and while for people with higher and secondary education with A level is the most important factors discouraging them from their purchase of private label products their quality, in the case of people with primary education is it the price and for people with secondary education without A level is their content.

Based on the results of our research, we can conclude that there are still some reserves and problems which could be improved and eliminated as for example the consumers' perception of the private labels' quality, which has to be improved by producers and retailers, who can promote their products especially from this perspective; the still uninteresting cover of these products, where there can be used more colours and more interesting ink to attract consumers; as well as the missing or very small information about the producer, which could be shown on

the packaging of private labels to let customers know, who is the proper producer of them.

Acknowledgements

Note

The present paper is an extension of author´s previous research, which was presented on the 7th International Conference on Management (ICoM 2017) „Managerial trends in the development of enterprises in globalization ERA" on June 1 – 2, 2017 in Nitra, Slovak Republic.

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SITUATION IN THE MARKET OF BAKERY PRODUCTS

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Abstract

Behaviour and requirements of customers have changed over the years, and therefore it is necessary to clarify what is important for customers when they purchase bread, pastries and other bakery products. Consumers currently have high requirements on the quality of marketed food, range of products, and try to eat healthier. The aim of the paper is to point out the bakery industry in Slovakia. This paper also deals with the production of bakery products, the quantities consumed and the prices of these products. Secondary data from the database of Statistical Office of the Slovak Republic were used in the processing of the issue. The primary source of information were results of a questionnaire survey aimed at finding out consumers´ behaviour in the Slovak food market with bakery products. Based on the results, it can be stated that most commonly purchased bakery products among Slovak consumers are bread and regular pastries, which are most often purchased several times a week. The results of the survey also show that the price of bakery products is important for Slovak consumers, but the majority of them decide on the basis of past experience with the manufacturer. The questionnaire survey was also concentrated on the new concept of the bakery with the sitting, and based on the results, we can state that more than 50% of consumers would welcome this option. According to the findings it is possible to assume that the bakery industry has a potential in Slovakia and has become a perspective field in the Slovak food market.

Keywords: bakery industry, bakery products, consumer, consumer behaviour, market

JEL Classification: *Q 13, M3, M 31,*

1   Introduction

Nowadays, bread, pastry and other bakery products are a part of the daily diet of most people. The importance of bakery products in human nutrition is significant, because these products are the basis of the food pyramid and have a high nutritional value (Nagyová et. al., 2014, Sherwood, 2013, Al-Mussali & Al-Gahri, 2009). In the context of the mentioned, the bakery industry has the potential and offers the opportunity for small and medium-sized enterprises in the field of bakery (Khana, 2014, Kiumarsi, Jayaraman, Isa, & Varastegani, 2014). There is a gradual decline in the consumption of bakery products, which could be caused by substitution of bread for other types of food products. For this reason, the aim of this paper is to point out this negative trend and the factors that determine the consumption of bakery products.

1.1 Market of bakery products in the Slovak Republic

The production of bakery products is not stable, because it changes and adapts to the requirements and needs of consumers, and it is sometimes problematic to estimate and assume their consumer behaviour (Eglite & Kunkulberga, 2017).

In the Slovak Republic, the bakery industry is one of the largest food sectors in terms of both the number of establishments and the number of employees. Nowadays there are about 7,000 employees in more than 500 plants in Slovakia. Of the total number of plants, there are 20 industrial and large-capacity plants, which are equipped with tunnel furnaces and continuous lines. There are approximately 40 medium sized bakeries with more than three furnaces, and others include small, craft bakeries with one or two furnaces and up to 50 workers. We estimate that industrial bakeries produce about 40% of total bakery production, 15% of the bakery products are produced in the trade chains (in store bakery and baking frozen products) and the remainder of bakery products are produced by small and medium-sized bakeries. The bakery industry is involved by 7 % of total revenues and production of the food industry. (Ministerstvo poľnohospodárstva a rozvoja vidieka Slovenskej republiky [MPRV SR], 2014).

In recent years, the production of bakery products has been influenced by the widespread technology of pre-baking and freezing of bakery products. This technology enables foreign suppliers to enter our market, which has been protected by the short durability of fresh products. In the context of the mentioned, the production of bakery products has declined and nowadays the production of fresh bread is more than 87 thousand tonnes, and in the case of fresh pastry it is only 49 548 tonnes per year. Based on the data from Štatistický úrad Slovenskej republiky [ŠÚ SR] (2017) we point out the possible development of the production of

bakery products with a prediction for the next two years. According to the determination index (R2), it can be estimated that with 32.66 % reliability, the production of bakery products will decline and will reach approximately 41 thousand tonnes in the years 2017-2018 in the Slovak Republic.

Figure 1 **Production of bakery products in the Slovak Republic (in tonnes)**
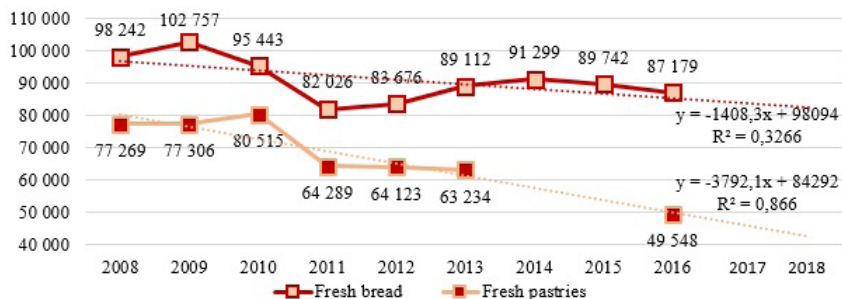
Source: Own processing according to ŠÚSR, 2017, own calculations.

The production of bakery products is primarily dependent on consumption, which is gradually decreasing. Based on the data from ŠÚ SR (2017), we can claim that the consumption of bread decreased by 18.7 % in the period from 2008 to 2016 and nowadays it stands at 34.3 kg per capita of the Slovak Republic. We also examined the consumption of wheat bread, which ranged from 29 to 30 kg per person in the observed period. Based on the above, we can state that the popularity of bread consumption has been decreasing in the recent years. In the context of this information, we point out the possible development of bread consumption with a prediction for the next two years. According to the determination index (R^2), it can be estimated that with 95.31 % reliability, the consumption of bread will decline and will reach approximately 33 kg per capita and year in the years 2017-2018 in the Slovak Republic. Consumption of bread is lower by 21 kilograms in the comparison with the nutritional aspect and the recommended bread consumption (Pachingerová, 2009). This fact may be caused by changes in the preferences of Slovaks in their efforts to eat rationally and healthily. In the context of the consumption of bakery products, it is important to focus on the different consumption of bread per capita in the countries of the European Union. According to the Association Internationale de la Boulangerie Industrielle [AIBI] (2015) the highest bread consumption per person and year is recorded in Turkey and Bulgaria (approximately 100 kg) and the lowest in the United Kingdom (approximately 32 kg).

Figure 2 **Consumption of bakery products per capita in the Slovak Republic (in kg)**
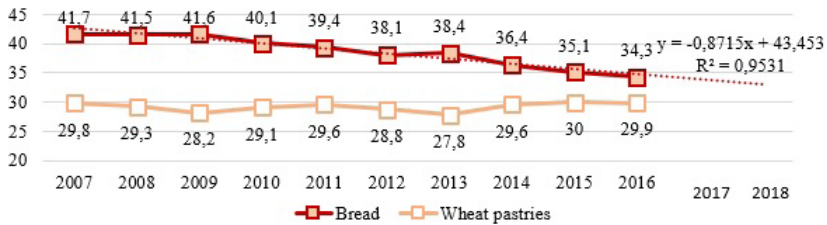
Source: Own processing according to ŠÚSR, 2017, own calculations.

In connection with the above, it is important to analyse consumer preferences and factors that affect the consumption of bakery products in order to increase the consumption of bread.

1.2 Consumer behaviour in the market of bakery products

In general, consumer behaviour can be defined as the behaviour that occurs in the search, purchase, use and disposal of products and services which meet the needs of consumers (Horská et al., 2009, Schiffmann & Kanuk, 2004, Richterová, Kulčáková, Klepochová, & Kopaničová, 2010). The choice of food is influenced by several factors and criteria that the consumer considers as important in the process of purchasing, such as the perception of food safety (Adam, Hiamey & Afenyo, 2014), quality perception (Stávková, Stejskal & Toufarová, 2008, Wingert, Zachary, Fox, Gittelsohn, & Surkan, 2014), food prices (Kubicová, Kádeková, Nagyová & Stávková, 2014, Kubicová, Nagyová, & Kádeková, 2013), food origin (Kleinová & Lušňáková, 2011). In the context of bakery products, Khanna (2014) has defined freshness, price and quality as three key factors that are crucial to the purchase and consumption of this type of food.

The first factor that greatly affects the consumption of bakery products is consumer prices (Nagyová, Stávková, & Kádeková, 2013). In the Slovak Republic, prices of fresh bread are constant at the level of 0.06 Eur per 40 grams, what is mainly caused by the pressure of trade chains (Únia priemyselných pekárov, 2015). Regarding the prices of bread, the development was fluctuating. In the first year of the observed period, the price of a kilogram of bread was 1.03 Eur. In 2015 the price was rising to 1.34 Eur and nowadays the price is at the level of 1.22 Eur (ŠÚ SR, 2017). Based on the data from ŠÚ SR (2017) we point out the possible development of price of bread with a prediction for the next two years. According to the determination index (R2), it can be estimated that with 36.67 % reliability,

the consumer price of bread will increase and will reach approximately 1.38 Eur per kg of bread in the years 2017-2018 in the Slovak Republic.

Figure 3 **Consumer prices of bakery products in Eur**
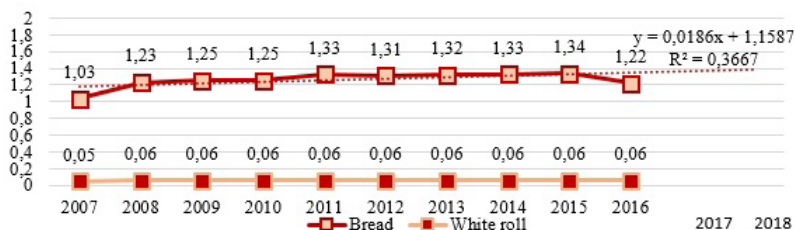
Source: Own processing according to ŠÚSR, 2017, own calculations.

Another factor that influences consumer decisions on the purchase of bakery products is the perception of their quality by consumers. The quality of bakery products, which is perceived by consumers, is determined by the sensory and health aspects (Stávková & Turčínková, 2005, Skořepa & Pícha, 2016, Nagyová, Horská & Kádeková, 2011). Bread and other bakery products are considered as healthy foods due to the content of carbohydrate, fiber, protein and fat (Kearney, 2010). Consumption of bakery products is also related to tradition in the most of European countries, so it is necessary to point out their importance in culinary culture. Moreover, traditional bakery products are considered the most delicious. For this reason, tradition and authenticity have a significant place in the bakery industry (Low Energy Ovens, 2012). Nagyová, Rovný, Stávková, Uličná and Maďarová (2009) emphasize that consumers prefer the quality aspect and external subjective factors such as the shape, appearance, colour, or flavour of pastries and bread in the process of buying bakery products.

The last significant factor that affects the purchase and consumption of bakery products is their freshness. Freshness also relates to the health aspect of bakery products, which means that fresh bread and pastries do not contain saturated fats and artificial ingredients, which are often used to extend durability. Based on the mentioned, it is possible to state that fresh bakery products have positive aspects for human health, which may be the reason for buying this type of bakery products (European Bakery & Cafe, 2014).

The place of purchase also initiates consumers to buy and consume bakery products. Bakery products are available in hypermarkets, supermarkets, bakeries, local stores, or in specialized grocery stores. In the world, the sale of bakery products is realised in various alternative forms, such as the sale of pastries in

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fast food, the sale of pastries in cafes and so on (Fremaux, 2014). In the Slovak Republic, these types of sales are not expanded, so we think that the increase in bread and bread consumption could be realized by the concept of bakery with seating for coffee, tea or other beverages. Consumers could enjoy the freshness of the bakery products and observe the process of their production.

2   Data and Methods

The aim of the paper is to focus on the purchase of bakery products in the Slovak Republic. In connection with its fulfilment, methods of collecting and obtaining information and methods of information processing were used.

Within the scope of data collecting methods we used secondary and primary data. Secondary data represent information from domestic and foreign literature and web pages focused on processed issues. Primary data were obtained from the results of the questionnaire survey on a random sample of 240 respondents in December 2017 and January 2018. Respondents were divided into 6 categories by gender, age, education, residence, economic status and monthly income. The classification is shown in Table 1.

Table 1 **The segmentation of respondents from the aspect of selected criteria**

Gender	n	%	Education	n	%
Men	118	49,17	Elementary	22	9,17
Women	122	50,83	Secondary without maturity	53	24,09
Age	**n**	**%**	**Secondary with maturity**	**103**	**42,92**
Less than 24 years	76	31,67	University	62	25,83
25 – 40 years	53	22,08	**Residence**	n	%
41 – 54 years	63	26,25	City	127	52,92
More than 55 years	48	20,00	Village	113	47,08

Working status	n	%	Monthly income	n	%
Student	48	20,00	Nothing	53	22,08
Employed	137	57,08	Less than 500 eur	50	20,83
Unemployed	12	5,00	501 – 1000 eur	130	54,17
Retired	7	2,92	More than 1001 eur	7	2,92
Maternity leave	17	7,08			
Self-employed	19	7,92			

Source: Questionnaire survey, 2018.

Obtained data were processed and analysed in Excel. Furthermore, for hypothesis testing, following statistical tests were applied:

- Chi-Square Test of Independence
- Cramer´V coefficient
- Test of hypothesis for a proportion

In relation to the objective and methods, the following hypotheses were formulated:

- Hypothesis 1: We assume that there is a dependence between the most frequently purchased bakery products and the respondents' gender.
- Hypothesis 2: We assume that more than 20 % of respondents buy bakery products daily.
- Hypothesis 3: We assume that there is a dependence between the place of purchase and the residence of the respondents.
- Hypothesis 4: We assume that for more than 40 % of respondents, the price is an important criterion for choosing bakery products.
- Hypothesis 5: We assume that more than 30% of respondents would welcome the new concept of a bakery with seating.

3   Results and Discussion

The aim of the questionnaire survey was to find out, which bakery products are most commonly bought by consumers. Based on the results, we can state that 45% of respondents mostly buy regular pastries, including rolls, buns, salty scones, baguettes and so on. 42.92% prefer bread as the most commonly bought bakery product. 7.92% of respondents mostly buy fine bakery products, including different cakes, croissants, gingerbread and 4.17% of the respondents prefer to buy other bakeries, such as bread crumbs, biscuits, maces, sticks, etc. Skořepa and Pícha (2016) conclude that consumers mostly buy bread within the bakery products.

Figure 4 **The most commonly bought bakery products**
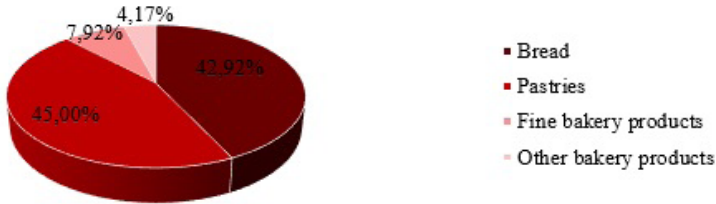
Source: Questionnaire survey, 2018.

In the context of this question, we found the dependence between the most commonly bought bakery products and gender of respondents and following hypothesis was examined and formulated:

H0: It is assumed that there is no dependence between the most frequently purchased bakery products and the respondent's gender.

H1: It is assumed that there is a dependence between the most frequently purchased bakery products and the respondent's gender.

Based on the results of Chi-Square Test of Independence we can conclude, that the calculated value of Chi (3.268) is lower than the table value of Chi (7.815), therefore the null hypothesis was accepted, what means that gender does not have a statistically significant impact on the most frequently purchased bakery products.

The consumer survey was also focused on the frequency of buying bakery products. Most respondents, representing 49.58%, buy bakery products several times a week. 26.05% of respondents prefer fresh bakery products every day. 14.29% buy bakery products approximately once a week, and the other 10.08% of consumers claim that they buy bakery products less than once a week. Rajput, Kesharwani and Khanna (2012) also surveyed the frequency of purchases of bakery products by consumers and concluded that 34% of all respondents buy bakery products every day.

Figure 5 **Frequency of purchases of bakery products**
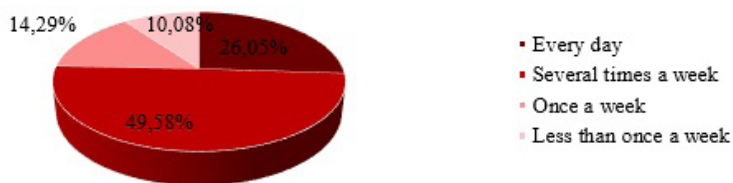
In the context of the question, the following hypothesis was formulated and statistical test of hypothesis for a proportion was applied:

H0: It is assumed that 20 % of respondents buy bakery products daily.

H1: It is assumed that more than 20 % of respondents buy bakery products daily.

Results showed that p – value (0.2583) is not in confidence interval <0, 0.24247>, therefore the null hypothesis was rejected and it can be concluded that more than 20 % of respondents buy bakery products every day.

The questionnaire for Slovak consumers was also focused on the question of the place of purchase of bakery products. Based on the results of the questionnaire survey, we can state that the most popular place to buy bakery products are supermarkets, which are used by 37.08% of respondents. 27.92% prefer to buy bread and other bakery products in bakeries. 20.83% of respondents mostly buy bakery products at small local stores and 14.17% of respondents prefer hypermarkets.

Figure 6 **The place of purchase of bakery products**
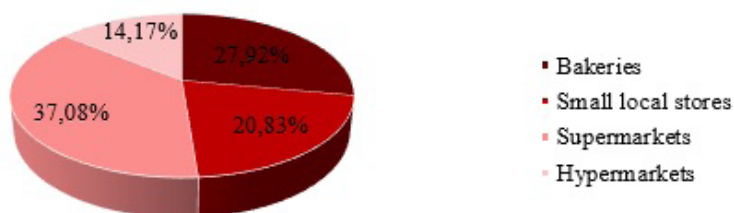
In the context of this question, we found the dependence between the place which consumers prefer for buying of bakery products and their residence and following hypothesis was examined and formulated:

H0: It is assumed that there is no dependence between the place of purchase and the residence of the respondents.

H1: It is assumed that there is a dependence between the place of purchase and the residence of the respondents.

Based on the results of Chi-Square Test of Independence we can conclude, that the calculated value of Chi (4.4499) is lower than the table value of Chi (7.815), therefore the null hypothesis was accepted, and it means that the residence of consumers has not statistically significant impact on the place of purchase of bakery foods.

In the questionnaire survey we were interested in what factors influence consumers in the process of buying bakery products. 77.5% of all respondents purchase a bakery product based on their past experience. 34.17% of consumers buy bakery products based on recommendations. The manufacturer's brand is an important criterion for the purchase of bakery products for 18.33% of consumers. Advertising is important for approximately 11.67% of respondents and packaging influences 8.33% of respondents. 5.83% of consumers claimed that they were influenced by other factors, especially the appearance of the product, its price and taste.

Figure 7 **Factors influencing consumers in the process of buying bakery products**
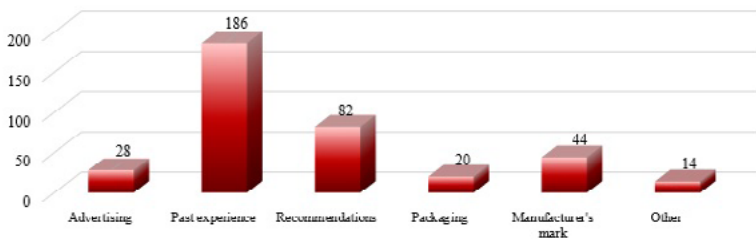
Source: Questionnaire survey, 2018.

The aim of the questionnaire survey was to determine whether the price is an important factor in the process of buying bakery products. Based on the results, the price of these products is important to 50.83%. 34.17% of consumers claimed that the price of bakery products is less important to them. On the other hand, the price is a very important criterion to 12.08% of respondents. 2.92% of respondents consider the price of bakery products as an unimportant criterion, so we suppose they are more interested in the quality of the products. Eglite and Kunkulberg (2017) concluded that the price is a decisive factor in the purchase of bakery products with emphasis on bread.

Figure 8 **The importance of the price of bakery products**
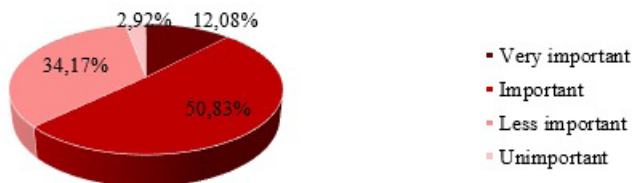
Source: Questionnaire survey, 2018.

In the context of the question, the following hypothesis was formulated and statistical test of hypothesis for a proportion was applied:

H0: It is assumed that to 40 % of respondents, the price is an important criterion for choosing of bakery products.

H1: It is assumed that to more than 40 % of respondents, the price is an important criterion for choosing of bakery products.

Results showed that p – value (0.50833) is not in confidence interval <0, 0.45202>, therefore the null hypothesis was rejected and it can be concluded that the price is an important criterion for choosing of bakery products to more than 40 % of respondents.

Within the consumer research, we were interested in how Slovak consumers perceive the quality of bakery products sold in the Slovak market. Based on the results of the survey, we can conclude that 52.08% of consumers consider the quality of these products as good. 32.92% of respondents are satisfied with the quality of the products and perceive it as very good. 12.92% of respondents consider the quality of domestic bakery products as adequate. 2.08% of respondents evaluate the quality of these products as bad. Vilhanova (2010) emphasizes the quality of domestic products in comparison to foreign bakery products. Based on the results she concluded that 51% of respondents think that domestic and foreign products are the same, 20% of respondents consider domestic food as better than foreign bakery products and 8% think domestic foods are less good than foreign ones.

Figure 9 **Consumers' perception of the quality of bakery products**
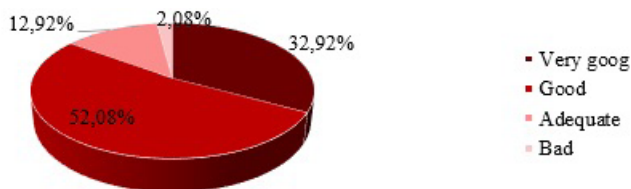
Source: Questionnaire survey, 2018.

In the last question of the survey, we asked if the respondents would welcome a bakery that would offer them an option of sitting and snacking. 54.17% of respondents welcome this option and would like to visit this bakery. This type of bakeries is not widespread in the Slovak Republic, so 30% of the respondents do not know, whether they would welcome this concept of bakeries. A negative response was identified by 15.83% of Slovak consumers.

Figure 10 **The concept of bakery with seating**
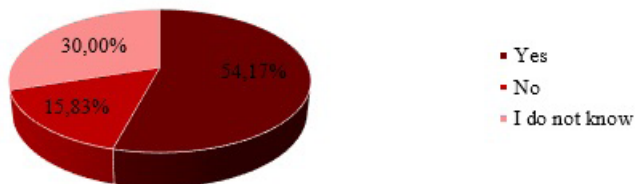
Source: Questionnaire survey, 2018.

In the context of the question, the following hypothesis was formulated and statistical test of hypothesis for a proportion was applied:

H0: It is assumed that 30% of respondents would welcome the new concept of a bakery with seating.

H1: It is assumed that more than 30% of respondents would welcome the new concept of a bakery with seating.

Results showed that p – value (0.541667) is not in confidence interval <0, 0.348655>, therefore the null hypothesis was rejected and it can be concluded that more than 30% of respondents would welcome the new concept of a bakery with seating.

4   Conclusion

The bakery industry has recently become a topic of discussion on the Slovak food market. The objective of the paper was to point out the indispensability of the bakery industry among the food sector. Bakery products are expected to be produced at a lower level during the following years. The reason behind is the technology of pre-baking and freezing of bakery products. On the other hand, it is important to emphasize that the consumption of pastries is constant and these products are widespread among consumers. This is confirmed by the results of the questionnaire survey, which showed that consumers buy bakery products more than once a week, they prefer supermarkets and decide based on previous product experience. Slovak consumers consider the quality of domestic products as good, but the price of bakery products is still important to them. The survey showed that the consumption of bakery products could be increased by more interactive sales of bakery products. For this reason, we propose to create new concepts of bakeries with sitting for coffee, tea or other beverages in the Slovak Republic. The consumer would be able to comfortably enjoy fresh pastries while watching individual parts of the process of producing bakery products. This may be the reason for the repeated purchase and consumption of pastries.

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SYMPTOMS OF SMART SHOPPING IN PURCHASING BEHAVIOUR OF FOOD PRODUCTS CONSUMERS

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Abstract

The aim of the research was an attempt to identify elements of consumer buying behaviour that are symptoms of smart shopping. Direct quantitative consumer research was conducted in 2017 in Poland using the CAWI method. 272 respondents participated in the study. Smart shopping is determined as clever, thoughtful shopping. Its rapid development could be observed at the beginning of the 21st century as a consumer response to the economic downturn of 2008-2009. The conditions of economic uncertainty of this period resulted in consumers starting to take activities, which aimed at reducing the expenditure for consumption. The results obtained during consumer surveys in Poland indicate that respondents have a varied attitude towards the possibility of using market opportunities while purchasing food products. The manner most often used by respondents to make clever shopping is to buy two products for the price of one, which significantly reduces the purchase price. Not less popular among respondents is the collection of points in loyalty programs, which can be exchanged for vouchers, prizes or consumers can pay for future purchases with these points. A characteristic feature of a smart consumer is active searching for information about products and their prices. According to respondents, printed leaflets and leaflets available on websites containing current shops promotions are particularly helpful in searching for information. Smart shopping is sometimes regarded as a trend associated with the sustainable consumption. It is confirmed by the fact that consumers prepare for shopping by making a list of products they need. The buying process does not end with the act of purchase. The last phase are the feelings the consumers have after purchasing the products. The respondents have

declared that in the case of purchasing products that are on promotion, they most often have positive feelings.

Keywords: *smart shopping, consumers, food products*

JEL Classification: *D10,D19, M31*

1   Introduction

The years of the economic crisis from the beginning of the 21st century brought about an increase in unemployment, an unstable financial situation and fears about the future. All this resulted in consumers being subjected to strong psychological pressure, the effects of which could be observed in the change of their purchasing behaviour (Ang, Leong & Kotler, 2000; Quelch & Jocz, 2009; Lache, Boldureanu, Boldureanu & Paduraru, 2010; Pandelica & Pandelica, 2011). Consumers began to rationalize their shopping habits. An example of such a rationalization is a trend called smart shopping. This is a multi-faceted phenomenon, as it can be considered in the context of the impact of marketing techniques and product prices on the behaviour of buyers, as well as the assessment of the importance of promotion for consumers.

Mano and Elliott (1997) described smart shopping as a tendency for consumers to invest their time and effort in seeking and using information related to promotions in order to achieve price benefits. Smart shopping was similarly defined by Zalega (2013). According to this author, smart shopping means consumer activities that involve engaging in the search for information about promotions, comparing the prices of many products, looking for market opportunities and saving money. Research on the phenomenon of smart shopping was conducted by Atkins and Kim (2012).

Behaviour that characterizes clever consumers is distinctive and different from other shopping behaviours. After shopping, they experience satisfaction resulting from the savings obtained as well as a hedonic aspects (Bicen & Madhavaram, 2013). Smart consumers are aware of their needs. They are people who know what they want, as well as how to achieve the intended goal. Their knowledge is reflected by greater market awareness and the ability to properly assess the attractiveness of the offer. Smart consumers are aware of the fact that knowledge about the promotion is very much needed for them and gives the opportunity to rationally assess the attractiveness of the offer. They are not only promotion hunters, which distinguishes them from the so-called economic buyers (Kaniorczyk, 2014). First of all, they look for the optimal price in the comparison to the obtained benefits. They convert time and cost of travel to a given store to assess the actual value and

profitability of the promotion. Smart consumers feel pride after shopping that the time devoted to the search for promotions brought the expected benefits.

Sharing information about promotions is very popular among clever consumers. Many groups are formed on social networking sites, whose observers post information about current promotions. On this type of site you can also learn about competitions with prizes, discount coupons, samples, free testing of products that later become the property of the person doing the testing (Reformat, 2014).

Polish consumers want to be "smart" in everyday shopping. The optimization of purchases or purchase decisions does not stop at the level of the household budget or sales channels, but goes much deeper to the level of product categories. In this context, smart shopping concerns, for example, the selection of private label products of retail chains. However, the choice of private label products must be supported by consumer confidence (Jasek, 2012).

Though understanding the meaning of the term "smart shopping" is important for marketers, retailers and researchers, the literature lacks studies that examine smart shopper purchasing experiences (Atkins & Hyun, 2016).

The aim of the research was an attempt to identify elements of consumer buying behaviour that are symptoms of smart shopping. In order to achieve the aim, the following research tasks were established:

- evaluation of the importance of sources of information used in the decision-making process by the respondents,
- determination of popularity of opportunities used for smart shopping by the respondents,
- evaluation of statements describing the behaviour associated with smart shopping of food products by the respondents,
- verification of the frequency of the respondents' perception of positive and negative emotions after making smart purchases.

2   Data and Methods

Direct quantitative consumer research was conducted in 2017 in Poland using the CAWI method. The questionnaire contained questions allowing the characteristics of the surveyed group of respondents and substantive questions related to the research tasks. The selection of the sample was non-random. 272 respondents participated in the study among which, women constituted 67.3%, whereas man 32.7%. Persons up to 30 prevailed in the studied sample constituted 47.4%. Respondents in the 31-40 age group made up 19.1 %, aged 41-50 constituted 17.6 %, whereas those over 50 - 15.9 % of the studied sample. Three respondent groups

were identified according to the education level, in which 22.1% declared vocational education, 47.8 % declared secondary education, whereas 30.1% higher education. Due to the income level, four groups of respondents were distinguished. In order to calculate the level of income per person in a household into the currency expressed in EUR, a ratio of PLN 4=EUR 1 was assumed. Respondents with income up to EUR 250 per person accounted for 30.5% of the respondents, whereas within the range of EUR 251 to 375 - 16.2%, while the other two groups, from EUR 376 to EUR 500 and over EUR 500, had a similar share (26.5% and 26.8% respectively).

Structure indicators, the mean (M) and the standard deviation (SD) were used in the descriptive analysis of the results. For the statistical analysis of the significance of connections between respondents characteristics and their responses measured on the qualitative scale a non-parametric test chi-square ($\chi 2$) was used. In order to compare the mean estimates made on the rank scale by k-independent groups of respondents, a one-way analysis of variance (F) was used. In order to establish statistically significant differences between the average mean, a RIR Tukey post-hoc test was performed. The adopted level of significance for all analyses was 0.05.

3   Results and Discussion

As a result of the spread of communication and information technologies, consumers are increasingly becoming experts in obtaining information. Under this influence, they modify their previous market behaviour, becoming more aware participants of market processes. They expect interesting offers from enterprises and analyse the market in search of opportunities with pragmatism. Smart consumers carefully follow and analyse all information regarding promotions that can be obtained directly at the points of sale, as well as beyond.

The subject of the assessment made by respondents were the sources of information about promotions and prices that they use when planning or purchasing food products (Table 1). Respondents had a 5-point scale at their disposal, where 1 was not significant, and 5 - a very important source of information. The results of the analysis show that the highest rated source of information is the possibility of comparing the offers directly in the store. The average rating of this source of information was 3.47 (SD=1.10) on a five-point scale. The TNS Shopper DNA 2016 survey conducted in Poland shows that the comparison of products and their prices during purchase is made by about 30% of consumers (Polski smart shopper …, 2016).

The second most popular way of obtaining information by the respondents is to browse advertising leaflets with the offer of retail chains (M=3.33, SD=1.1). Leaflets are an inseparable element of marketing communication between the store and the clients, but often their functions are not limited to the presentation of current promotions. They may also include recipes, tips, contests, information on social campaigns, charities or services. The "traffic" leaflets, which appears every week, is the most popular type of leaflets among retail chains (Szymborski, 2012). Nearly 1/3 of Poles (29%) declare a thorough reading of the received advertising leaflets, which are for them the main source of knowledge about price promotions (Reformat, 2014).

Consumers, as market participants, are open to various sources of information that they use, comparing products and their prices. However, TVcommercials turned out to be a rather insignificant source of information in their opinion (M=2.63, SD=1.1). This means that consumers aren't guided at the shopping by emotions fueled by advertisements (Reformat, 2013). This impersonal form of communication has led to aversion on the part of consumers. There is also a lack of trust among consumers regarding advertising. Confirmation of this are the results of research presented in the Flash Eurobarometer report (2013), which indicate that 56% of Polish consumers declared in 2012 that in the previous 12 months they had come across misleading advertisements, statements or offers. Misleading or deceptive advertisements are those which contain false information.

The least popular source of information on the prices of food products among respondents are price comparison websites. This is a tool thanks to which one can compare the prices of the same products in various stores that offer their goods on the Internet. In addition, their advantage is the availability of the opinions of other buyers, which concern not only the products, but also the stores themselves (service quality, shipping speed, complaint processing). The KPMG (2017) report concerning the shopping habits of Poles shows that 27% of respondents admit that before making a purchase, they compare product prices on special websites. However, despite their advantages, they obtained an average score of 2.47 (SD=1.36) on a five-point scale. The low rating results from the fact that shopping for food products via the Internet is still not very popular among consumers who use this channel mainly to purchase durable goods. It is estimated that only 4% of Polish internet users have done this type of shopping at least once (Polski smart shopper …, 2016).

Table 1 **Evaluation of the importance of information sources used by the respondents in the decision-making process**

	Gender		F	Income per person in a household				F
	Female	Male		Up to 250 EUR	251-375 EUR	376-500 EUR	Above 500 EUR	
	M (SD)	M (SD)		M (SD)	M (SD)	M (SD)	M (SD)	
Price comparison websites	2.43 (1.35)	2.57 (1.36)	0.70	2.29 [d] (1.29)	2.05 [e] (1.32)	2.70 (1.05)	2.97 [d), e] (1.46)	6.94
Leaflets	3.63[a] (1.03)	2.72[a] (0.99)	48.59	3.24 (1.02)	3.52 [f] (1.02)	3.73 [g] (0.76)	3.01 [f), g] (1.34)1	5.01
TV commercials	2.80[b] (1.06)	2.27[b] (1.08)	15.02	2.60 (1.16)	2.68 (0.78)	2.48 (1.00	2.69 (1.33)	0.45
Comparison of product in the store	3.65[c] (1.03)	3.09[c] (1.14)	16.54	3.57 [h] (0.94)	3.77 [i] (0.98)	3.80 [j] (0.79)	2.85 [h), i), j] (1.29)	12.43

a), b), c),d), e), f), g), h), i), j) - differences between means are statistically significant at p≤0.05
Source: Author's calculations.

The analysis made it possible to check whether the demographic characteristics of the respondents (gender and income per person in the household) influence the assessment of the *source*s of information made by the respondents (Table 1). All sources, with the exception of online price comparison sites, were rated higher by women than men. In addition, the results of analysis of variance showed statistically significant differences in the assessment of such sources as advertising leaflets (F=48.59, p≤0.05), TV commercials (F=15.02, p≤0.05) and comparison of product offers in the store (F=16.54, p≤0.05) made by men and women. Statistically significant differences in the assessment of information sources were also received when taking the income per capita in the household of the respondents into account. They concerned the assessments of the online price comparison sites (F=6.94, p≤0.05), in the case of which the highest average assessment was obtained in the group of respondents with income above EUR 500 per person, while the lowest in the group of respondents with income of EUR 251-375 per person. Also the ratings of leaflets of retail stores made by the respondents turned out to be statistically significant (F=5.01, p≤0.05). The highest average assessment were obtained in the group of respondents with income of EUR 376- 500, the lowest in the group with the highest income. A similar situation took place in the

case of evaluations regarding the comparison of offers directly in stores, which also turned out to be statistically significant (F=12.48, p≤0.05).

Consumers, when planning and making purchases of food products, use different ways to make these purchases bring additional benefits (Table 2). They are most willing to use the possibilities that give the effect of a lower purchase price. One of such forms of promotion is an offer to buy two products for the price of one. This is the preferred method for the highest percentage of respondents (over 64%), with women showing more interest in this type of opportunity than men, and these differences are statistically significant (χ^2=14.80, df=1). In the case of the differentiation of the respondents due to the level of income, it can be observed that this method of smart shopping is most often used by persons from the group in which the income does not exceed EUR 250 per person per month, and the least often from the group with income above EUR 500. For income groups, however, the differences are not statistically significant.

The collection of points for purchases made is very popular among respondents. It is a very popular way of attracting customers to shopping, and this possibility is provided by participation in loyalty programs offered by retail chains, for which they are a marketing tool aimed at maintaining a stable share in a competitive market (Ou, Shih, Chen & Wang, 2011). Their purpose, addressed to consumers, is to change shopping habits, including increasing the frequency and volume of purchases (Uncles, Dowling & Hammond, 2003). Loyalty programs are a variation of commercial promotion, and consumers expect concrete material benefits in exchange for being associated with them (Matysik-Pejas, Szafrańska & Żmija, 2015). The points collected by participants of loyalty programs can be exchanged for coupons, giving the opportunity to buy products at lower prices or they can pay with them for subsequent purchases. The obtained results show that women (62.3%) collect points by participating in loyalty programs more willingly than men (51.7%). This tendency decreases with the increase in income per person in the household of study participants. Both in the case of gender and income, the differences between the respondents turned out to be statistically insignificant.

Table 2 **Types of opportunities used by the respondents for "smart shopping"**

	Gender		χ^2	Income per person in a household				χ^2
	Woman	Man		Up to 250 EUR	251-375 EUR	376-500 EUR	Above 500 EUR	
Points collecting	62.3	51.7	2.78	68.2	63.0	55.4	52.8	3.60

	Gender		X^2	Income per person in a household				X^2
	Woman	Man		Up to 250 EUR	251-375 EUR	376-500 EUR	Above 500 EUR	
Discount coupons	51.9	47.2	0.53	58.3	54.2	43.8	40.9	5.14
Competitions with prizes	27.3	27.0	0.01	15.7	28.8	31.9	38.6	9.39*)
Two products for the price of one	72.1	48.3	14.80*)	75.0	71.1	57.5	56.9	7.01
Gift for purchases	32.8	28.1	0.61	39.8	38.4	27.8	9.1	14.97*)

*) value of χ^2 is statistically significant at p≤0.05
Source: Author's calculations.

Participation in competitions with prizes and the receipt of a small gift for purchases are not popular ways for clever shopping. Consumers probably do not identify them directly with tangible financial benefits. In addition, participation in the competition does not guarantee the prize. In both cases, the indications of men and women are comparable. However, as the income of the respondents increases, their interest in participating in prize competitions increases and the interest in a gift for purchase decreases. In both cases, the differences between respondents representing different income level are statistically significant (accordingly $\chi^2=9.39$, df=3 and $\chi^2=14.97$, df=3).

On the basis of the literature (Block & Morwitz, 1999; Kaniorczyk, 2014; Reformat, 2013; Zalega, 2013; Zalega, 2016), statements describing behaviours that can be considered compatible with the idea of smart shopping were constructed. Respondents made assessments of these statements on a scale of 1-5, where 1 - the lack of consent, and 5 - total consent (Table 3). All statements presented were rated higher by women than men. Taking the income of the respondents into account, such regularity cannot be noticed in the tendency of the average scores for all the statements presented. The respondents most agree with the statement regarding the preparation of a list with necessary products before the purchase (M=3.69, SD=1.30). It is a way of a rational approach to shopping, thanks to which they avoid impulsive purchases and buying unnecessary products. Differences in the average assessment of this behaviour between women and men were statistically significant (F=33.86, p≤0.05), as well as between respondents with an income of

up to EUR 250 and above EUR 500 per person (F=3.11, p≤0.05). The results of the TNS Shopper DNA 2016 survey show that 19% of Poles prepare shopping lists, and over 30% check inventory status at home before shopping (Polski smart shopper …, 2016).

Table 3 **Evaluation by responders of statements describing the behaviour associated with smart shopping of food products**

	Gender		F	Income per person in a household				F
	Female	Male		Up to 250 EUR	251-375 EUR	376-500 EUR	Above 500 EUR	
	M (SD)	M (SD)		M (SD)	M (SD)	M (SD)	M (SD)	
I come to the store only because there is a promotion for specific food items that interest me	2.46 [a] (1.27)	1.83 [a] (0.83)	18.41	2.53 (1.31)	2.04 (1.03)	2.16 (1.09)	2.22 (1.17)	2.47
I come to the store on the first day of the promotion to make sure I buy cheaper food products	2.16 [b] (1.21)	1.55 [b] (0.67)	19.49	2.01 (1.23)	2.06 (1.10)	2.14 (0.96)	1.69 (1.00)	2.04
I usually buy the food products that are currently on promotion	2.43 [c] (1.17)	2.00[c] (0.99)	8.99	2.57 [e] (1.15)	2.48 [f] (0.97)	2.27 (1.065)	1.79 [e], [f] (1.15)	7.51
I prepare a list of food products that I want to buy	3.83 [d] (1.20)	3.40 [d] (1.45)	6.56	4.00 [g] (0.94)	3.90 (1.13)	3.55 (1.19)	3.40[g] (1.67)	3.11

[a], [b], [c], [d], [e], [f], [g] - differences between means are statistically significant at p≤0.05
Source: Author's calculations.

Other behaviours that may indicate a tendency to smart shopping have been rated lower than 3, with the lowest statement being that respondents come to the store on the first day of promotion to be sure they buy cheaper food products

(M=1.96, SD=1.10). The assessment of this approach to shopping is statistically significant due to the gender of respondents (F=19.49, p≤0.05). Differences in the assessments of other statements between men and women were also statistically significant. In addition, when assessing consumer behaviour aimed at purchasing products that are currently offered in the promotion statistically significant differences were found between respondents representing the income group above EUR 500 per person, and respondents from the income group up to EUR 250 and EUR 251-375 (F=7.51 , p≤0.05).

Decision making is an inseparable element of consumer behaviour. The decision-making process does not end with the actual act of purchase, and consumers are often accompanied by the emotions that emerge after the purchase. Consumers, when making decisions, expect positive emotions (pleasure and satisfaction) from their purchases, but this is not always the case - negative emotions may also appear (Hunt, 1991; Taylor, 2009; Bui, Krishen & Bates 2011). The study verified the frequency of consumer perception of positive and negative emotions associated with making smart purchases (Table 4). Respondents declared that in such a situation they are most often accompanied by satisfaction (65.4%), which can be described as a feeling of pleasure caused by the successful turnover of some matter. Gender significantly statistically differentiated respondents due to these types of post-purchase feelings (χ^2=12.95, df=1), with a higher percentage of women (72.7%) rather than men (50.6%), who made such declarations. In the case of the economic criterion, the differences in the frequency of satisfaction after "smart" purchases between respondents were statistically insignificant, and the observed trend shows that the highest rate of often felt satisfaction occurs in the group of respondents with the lowest income per person in the household and decreases as the material situation improves.

The second positive post-purchase feeling is pride, and hence satisfaction with achieving the intended goal, which often appears in approx. 23% of the respondents. Differences in the occurrence of the feeling of pride after shopping due to gender of the respondents turned out to be statistically significant (χ^2=19.37, df=1), because more than 4 times more women than men declared that pride often accompanies them after successful shopping. Frequent occurrence of pride is declared by around 30% of the respondents from the lowest income group and it can be observed that this indicator decreases as the income per capita in the household increases, reaching in the group with the highest income a value lower by over 15 pp. However, these differences were statistically insignificant.

Table 4 **Declarations of respondents concerning the feelings after making "smart purchases" of food products**

| | | Gender | | χ^2 | Income per person in a household | | | | χ^2 |
		Woman	Man		Up to 250 EUR	251-375 EUR	376-500 EUR	Above 500 EUR	
Pride	**Often**	30.6	6.7	19.37*)	30.1	29.5	19.2	13.9	7.46
	Rarely or never	69.4	93.3		69.9	70.5	80.8	86.1	
Satisfaction	**Often**	72.7	50.6	12.95*)	69.9	66.3	63.6	61.2	1.32
	Rarely or never	27.3	49.4		30.1	3.7	36.4	38.8	
Distrust	**Often**	7.7	27.0	18.59*)	9.6	9.6	9.1	26.4	12.57*)
	Rarely or never	92.3	73.0		90.4	90.4	90.9	73.6	
Anger	**Often**	4.4	0.0	4.01*)	0.0	8.2	4.5	0.0	12.22*)
	Rarely or never	95.6	100.0		100.0	92.8	94.5	100.0	

*) value of χ^2 is statistically significant at p≤0.05
Source: Author's calculations.

After shopping, consumers can experience negative feelings like distrust and anger. Distrust is a type of protective barrier that occurs with the perceived risk after purchase and maintains a distance and vigilance towards products. Anger is an emotional state that is a sign of dissatisfaction with the purchase made. For the entire sample, the rates of frequent occurrence of these negative feelings were not high and amounted to 13.9% and 2.9% respectively. The occurrence of feelings of distrust is significantly differentiated, both due to the gender of the respondents ($\chi 2=18.59$, df=1), and their affiliation in the income group ($\chi 2=12.57$, df=3). Also the frequency of occurrence of the feeling of dissatisfaction depended on the sex of the respondents ($\chi 2=4.01$, df=1), and income per capita in the household ($\chi 2=12.22$, df=3).

4   Conclusion

Smart shopping stimulates sensible household budget planning. Consumers commit their time to rationally use the opportunities for promotional purchase of food products offered by retail chains. It brings measurable benefits in the form of lower spending on product purchases that meet basic needs.

A characteristic feature of smart consumer is active searching for information about products and their prices. According to respondents, leaflets (available in printing version and on websites) containing current shops promotions are particularly helpful in searching for information. They also compare product prices directly at the point of sale.

Consumers willingly take advantage of market opportunities to make cheaper purchases of food products. The manner often way used by respondents to make clever shopping is to buy two products for the price of one, what significantly reduces the purchase price. Not less popular among respondents is collection of points in loyalty programs, which can be exchanged for vouchers, prizes or consumers can pay for future purchases with these points.

Smart shopping is sometimes regarded as a trend associated with the sustainable consumption. It is confirmed by the fact that consumers prepare for shopping by making a list of products they need. This limits unnecessary purchases and expenses.

The buying process does not end with the act of purchase. The last phase are the feelings the consumers have after buying the products. The respondents have declared that in the case of purchasing products that are on promotion, they most often have positive feelings such as satisfaction and sometimes also pride. Negative feelings also occur although less frequently.

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THEORETICAL ASPECTS AND PECULIARITIES OF EMOTIONAL BEHAVIOUR OF CONSUMERS

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Abstract

The article explores theoretical aspects of consumer behaviour, based on psychological, personal and emotional features of customers. It outlines the results of the first year of the research project VEGA 1/0502/17 "Consumer personality and its impact on emotional behaviour and decision making". In the article, the theoretical basis with respect to the above-mentioned project is investigated. It focuses on the chosen research directions, namely: psychology of consumers, personality psychology, neurophysiology, and neuroeconomics. The methodologies and results of previously conducted research studies were considered, taking into account their specific features and applicability in the frame of above-mentioned directions. Particular attention was given to possibilities and importance of the use of these approaches not only for scientific purposes, but also in practical activities of various trade companies.

Keywords: *consumer behaviour, consumer psychology, personality traits, emotional features, neurophysiology, neuroeconomics*

JEL cassification: M30, M31, M39

1   Introduction

An important prerequisite for successful trade activities is knowledge of customers and their needs, tastes and preferences. Nowadays, special attention is given to the study of emotional behaviour of consumers. The situation is that, in many cases, customers make decisions based on their emotions. For trade companies, it is important to identify factors that cause appearance of these emotions. In recent years, new directions of investigation of emotional behaviour of consumers have emerged, including, for example, neurophysiology, neuroeconomics, etc. These methods allow trade companies to track and anticipate consumer behaviour, which is of great practical importance. Thus, there is a certain need for consumer research with new methods. The aim of our article is to explore theoretical aspects of consumer behaviour, based on psychological, personal and emotional features of customers.

2   Theoretical Framework

Consumer psychology studies why people buy certain products or services. Psychology of consumer behaviour is essential for understanding different patterns of shopping behaviour. The connection of marketing communication tools and psychology is the building block of behavioural economic research.

Many authors from all over the world study consumer behaviour by many psychological tools. Research is conducted in several different areas of consumer interest and many factors that can possible influence consumer behaviour are taken into consideration.

Alfinito, Siqueira and Torres (2016) investigated the student´s choice of higher education institution in Brazil through the Consumer Cultural Influence Model that considers subjective aspects of consumer behaviour involving human values, social axioms, judgment and meaning of product, and product attributes. Findings reveal important results, student's choice showed to be related mainly to subjective aspects. When investigating consumer behaviour, Carey and Markus (2016) took into consideration also social class culture cycles. According to them, social class differences in consumer behaviour are not inherent or essential; instead, they are derived from differences in culture cycles. As people engage different cultures cycles, their behaviour will change.

Chartrand and Fitzsimons (2011) believe that consumer behaviour is driven by processes that occur outside a consumer's conscious awareness. In other words, individuals engage in consumption related cognition, motivation, decision

making, emotion, and behaviour without recognizing the role that nonconscious processes played in shaping them.

Despite indubitable contribution and importance of consumer psychology, Pham (2013) claims that consumer psychology nowadays has to face serious issues of internal and external relevance. He describes "seven sins" of consumer psychology. The most serious issues are narrow conception of the scope of consumer behaviour research and a strong tendency to overgeneralize from finite empirical results, both as authors and as reviewers.

We presume that these problems are real and we agree that any kind of psychology (and thus consumer psychology) has to respect numerous peculiarities of human behaviour and many limitations of research of human mind.

Nowadays, much attention in economic literature is paid to personality psychology. Personality psychology is specific area of psychology of consumer behaviour. Personality traits appear to be the significant predictors of consumer behaviour. Various aspects of personality psychology are considered, for instance, in Mayer (2007), Nilsson (2014), and Pervin (2008). It can help to better understand the existence of different responses of people in similar circumstances (Borghans, Golsteyn, Heckman, & Humphries, 2011). As stated by Funder (2009), personality theory should be constructed in a way which takes into account the personality triad of persons, behaviours, and situations. Concerning behaviour, it has at least four important roles in personality psychology, including:

1) Important behaviours are key phenomenon to be explained;

2) Behaviour is the foundation of important theoretical phenomena (e.g. cross-situational behavioural consistency);

3) Behaviour is a mechanism within psychosocial processes;

4) Behaviour reveals the importance and nature of personality constructs and measures (Furr, 2009).

Among models of personality, the Big Five model is supported by the majority of personality researchers. This model is a trait theory which considers five independent domain traits, namely: Openness to Experience, Conscientiousness, Extroversion, Agreeableness, and Neuroticism (Matz, Chan, & Kosinski, 2016). This model is based on findings of Costa and McCrae (1985). Description of individual dimensions of the Big Five model is presented in Table 1.

Table 1 **Big Five traits and facets**

Trait	Facets
Openness to experience	Fantasy, aesthetics, feelings, actions, ideas, values
Conscientiousness	Competence, order, dutifulness, achievement-striving, self-discipline, deliberation

Trait	Facets
Extroversion	Warmth, gregariousness, assertiveness, activity, excitement-seeking, positive emotions
Agreeableness	Trust, straightforwardness, altruism, compliance, modesty, tender-mindedness
Neuroticism	Anxiety, angry hostility, depression, self-consciousness, impulsivity, vulnerability

Source: Matz et al., 2016.

In the framework of the above-mentioned research direction, it is possible to identify a group of studies devoted to the influence of personality traits on the emotional behaviour of consumers.

Dant, Weaven, and Baker (2013) study impact of franchisee personality traits on the quality of franchisee-franchisor relationship. They apply the Big Five personality traits, which is based on IPIP-B5 scales when assessing whether there is such a link. Using regression analysis, it is discovered that four of five dimensions have an impact on relationship quality: it is positively affected by "agreeableness", "conscientiousness", and "emotional stability", there it is negative impacted by "extraversion".

Tauni, Fang, and Iqbal (2016) also use the Big Five personality framework (the NEO-Five Factor Inventory version) to examine an impact of investor personality on relationship information sources and trading behaviour in Chinese futures market. Based on confirmatory factor analysis, they discover that sources of information influence substantially trading frequency. Also, the researchers argue that investor personality traits moderate this type of relationship.

Lee, Lee, and Hansen (2017) explore how the Big Five personality traits affect understandings of source credibility of advertisement. They compare firm-generated and consumer-generated advertising approaches. The received results confirm that consumer-generated advertising is assessed by respondents more positively, and it is considered as a more credible source of advertisement. The researchers argue that the positive reaction towards consumer-generated advertising is found for consumers with low openness and customers who have high extraversion and low neuroticism.

Wan, Zhang, Wu, and An (2014) carry out a personality inventory test of users of Chinese social network Sina Weibo on the basis of the Big-Five approach. The researchers discover five most relative dimensionalities and apply machine learning method for personality prediction. They utilize Pearson Correlation

Coefficient to choose features and logistic regression and Naïve Bayes algorithms to predict user's personality.

Buettner (2017) uses a personality-based product recommender framework as the IT-artefact to predict user's personality and preferences, based on available social media data (an online social network XING dataset). The IT-artefact is grounded on two theories, namely: a) the Five Factor personality theory and b) the product personality – human personality congruency theory. He uses a personality-based product recommender framework to analyse social media data aiming at predicting a user's personality. The research results show that, regarding the possibility of recommending a product on the basis of identified user's personality, predictive gain is 45.1%.

De Montjoye, Quoidbach, Robic, and Pentland (2013) indicate the possibility of predicting personality traits based on standard mobile phone logs. They propose to use five sets of psychology-informed metrics, namely: basic phone use, active user behaviours, mobility, regularity, and diversity. Based on this information and selected 36 indicators, it is possible to determine users' personality with respect to the level of neuroticism, extraversion, conscientiousness, agreeableness, and openness quite reliably.

Gammoh, Mallin, and Pullins (2014) investigate how salespeople's own personality impacts the personality of the brand which they represent and its further influence on sales force outcomes (intrinsic and extrinsic motivation, task self-efficacy, and behavioural and outcome performance). To evaluate the measurement model and check the hypotheses, they utilize SmartPLS on the basis of a partial least squares structural model. Analysing the received research results, it is stated that that all of the proposed hypotheses are confirmed.

Except various psychological methods, many new methods of research are used nowadays. The high failure rate of new market introductions, despite initial successful testing with traditional sensory and consumer tests, initiates the need for different tests.

Consumer neuroscience methodologies were adapted from scientific disciplines where research is done in reverse from the scientific method that has come to inform the vast majority of marketing research (Daugherty, Hoffman & Kennedy, 2016). Application of neuroscience methods to analyse and understand consumer behaviour and marketing exchange has recently gained research attention (Yu & Zhou, 2007; Camerer, 2008; Levallois, Clithero, Wouters, Smidts & Huettel, 2012 and others). Consumer neuroscience, therefore, can significantly benefit research in the field of consumer behaviour, particularly in the attempt to better understand human behaviour in decision-making processes (Kenning & Linzmajer, 2011).

Neuroeconomics refers to a combination of paradigms derived from neuroscience, psychology, and economics for the study of decision making and is an area that has received considerable scientific attention in the recent literature. Using realistic laboratory tasks, researchers seek to study the neurocognitive processes underlying economic decision making and outcome-based decision learning, as well as individual differences in these processes and the social and affective factors that modulate them (Brown & Ridderinkhof, 2009).

Neuroscience offers plenty of methods that are able to light up the functioning of human behaviour. The most often used ones are those that can detect changes in central nervous system, like EEG and fMRI, but nowadays, also methods that can detect in autonomous nervous system are very popular. Autonomous nervous system is directly connected with central nervous system so these new methods can be very useful. Researchers mostly use measuring of heart rate, electro-dermal activity, breathing rate, softwares for studying emotions and facial expressions and many others.

Among modern neurophysiological methods that measure different processes of the human brain to different stimuli, a special place belongs to eye tracking. By detecting eye position, gaze direction, sequence of eye movement and visual adaptation during cognitive activities, eye tracking is an effective tool for experimental psychology and neurological research. It provides a quantitative and qualitative analysis of the gaze, which is very useful in understanding choice behaviour and perceptual decision making (Popa, Selejan, Scott, Mureşanu, Balea and Rafila, 2015).

Advanced neurophysiological technologies (EEG, EMG, GSR) may serve as a bridge between what can be consciously expressed, and what is hidden in the human mind. Such application of neuroscience to advertising may finally help to better understand the interplay of attention, emotions, and arousal—constructs of great importance to advertisers (Ohme, Matukin and Szczurko, 2010).

De Wijk, He, Mensink, Verhoeven and De Graaf (2014) explored the ability of selected physiological and behavioural measures of the autonomic nervous system (ANS) to distinguish between repeated exposures to food from a specific category and with similar liking ratings. Every food was presented five times, while ANS responses (heart rate, skin conductance response and skin temperature), facial expressions, liking, and intensities were recorded. The results showed that liking was associated with increased heart rate and skin temperature, and more neutral facial expressions. Intensity was associated with reduced heart rate and skin temperature, more neutral expressions and more negative expressions of sadness, anger and surprise.

Genschow, Demanet, Hersche and Brass (2017) conducted and experiment to reveal predictors of consumer behaviour. Authors assessed two explicit measures (self-reported habit and tastiness) and three implicit measures (manikin task, affective priming, ID-EAST) in order to test the predictive validity of affectively versus cognitively driven choices. The results indicate that irrespective of whether participants chose affectively or cognitively, both explicit measures, but not the implicit measures, were the best predictors of consumer choice.

Khushaba, Wise, Kodagoda, Louviere, Kahn and Townsend (2013) investigated physiological decision processes while participants undertook a choice task designed to elicit preferences for a product. The task required participants to choose their preferred crackers described by shape, flavour and topping. They used wireless EEG headset with 14 channels to collect EEG signals from participants and also Tobii-Studio eye tracker system to relate the EEG data to the specific choice options (crackers). There was a clear phase synchronization between the left and right frontal and occipital regions indicating interhemispheric communications during the chosen task. Results also indicated that there was a clear and significant change in the EEG power spectral activities taking a place mainly in the frontal, temporal and occipital regions when participants indicated their preferences for their preferred crackers.

Above mentioned methods are also very useful in combination with psychological research. Psychological test (especially projective) are able to explain implicit incentives of human behaviour. In combination with neuroscience we could possibly get clearer picture of functioning of consumer´s mind.

In three experiments, Reimann, Castaño, Zaichowsky and Bechara (2012) provide new insights into branding by studying the psychological and neurophysiological mechanisms of how consumers relate to their beloved brands. The authors propose that emotional arousal decreases over the brand relationship span, while inclusion of the brand into the self increases over time. Results of experiment 1 indicate greater self-reported emotional arousal for recently formed brand relationships, as well as decreased emotional arousal and increased inclusion of close brands over time. In the second experiment, authors measured skin conductance responses and revealed increased emotional arousal for recently formed close relationships but not for established close brand relationships, corroborating the results based on self-reported data. In experiment 3, a fMRI study revealed an association between established close relationships and activation of the insula, the crucial mechanism related to psychological constructs such as addiction and interpersonal love.

3 Data and Methods

The research conducted at FEM SPU in Nitra (Rybanská, 2017) was identifying where the test subjects looked during the repeated presentation of the selected soft drink commercial, what caught their attention, where they glanced again, how many times and for how long. Selected advertisement was presented 5 times in succession to thirteen respondents.

A fixed eye-tracker made by Gazepoint, attached to a 22-inch diagonal LED monitor, was used to monitor eye movements during the presentation of the selected commercial. This device uses eye-tracking technology based on pupil light reflection back to camera (bright pupil), and it is a binocular system with a sampling frequency of 60 Hz, with head movement tolerance 25x11 cm (horizontally x vertically). This device allows to scan respondents who wear glasses or contact lenses.

4 Results and Discussion

Although there might exist calibration deviation, essentially it is clear from the findings that respondents are targeting live objects (animals, humans) and looking at their faces. We did not notice significant deviations in the views during repeated viewing of the commercials, respectively, consumers tended to look at the same focal points in each of the five presented ad viewings. However, with every additional view, the range of interest points (shown on the thermal map in blue) has expanded (Figure 1).

Figure 1 **Summary heat map of 13 respondents with repeated exposure to the selected soft drink commercial (images captured every second)**
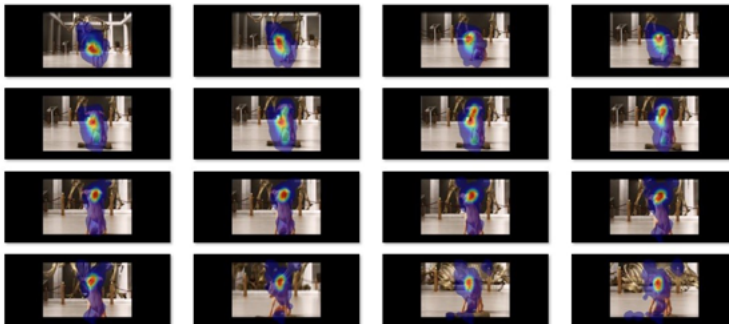
1st watching:
2nd watching:
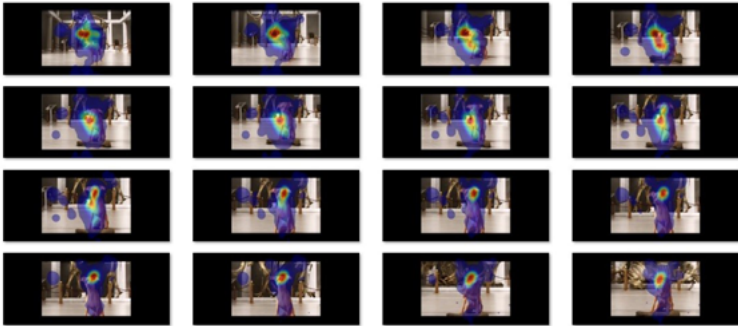
3rd watching:

4th watching:
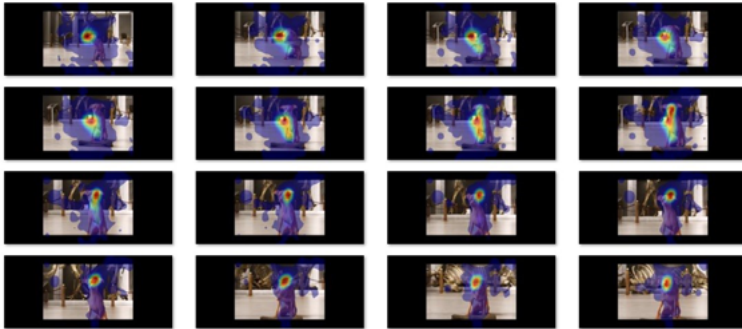
5th watching:
Source: Rybanská, 2017.

At the same time, there are some publications, the results of which differ substantially from the previously mentioned study. For example, Mulyanegara and Tsarenko (2009) investigate the strength of personality and values of prediction of brand preferences regarding Australian fashion market. Required information is received on the basis of prepared questionnaires which contain questions related to psychological characteristics (Big Five and Values), brand preferences, and demographic indicators. To analyse the data, the researchers utilize structural equation model. The research results show that personality does not have a strong relationship with fashion brand preferences, while values do have direct and indirect effects on these preferences.

Based on the personality assessment method, Bhardwaj, Atrey, Saini, and El Saddik (2016) find that there is a relationship between features of online social networks such as Facebook and LinkedIn and the Big Five personality traits. Though, this link is not straightforward, and it can be quite different, depending on the usage approaches and effectiveness rate.

Clark and Çallı (2014) investigate whether the Five-Factor Model of personality types can be utilized to predict emotional reaction of customers on advertisements placed in social media platforms like Facebook. However, this reaction can vary based on the user's personality type. Moreover, using a longitudinal analysis of respondents on the basis of Big Five personality model. Boyce, Wood, and Powdthavee (2013) state that personality can change, and it is closely connected with changes in the income level. Hence, further studies in this research field are needed.

5 Conclusion

So, it can be concluded that further research is needed in order to better understand peculiarities of emotional behaviour of consumers. We must try to find key factors influencing consumer behaviour not only among personality traits but also among values, opinions, family background and other factors connected with human beings and their lives. Appropriate combination of before mentioned factors with new research methods could lead us to possible explanations of consumer behaviour.

Acknowledgements

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HONEY CONSUMPTION PATTERNS OF YOUNG PEOPLE IN ROMANIA

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Abstract

The aim of the study was to identify and explore honey consumption patterns of young people (aged 18 – 30) in the Cluj region, Romania, based on primary data collected from questionnaire surveys conducted on a sample of 585 respondents. Questionnaires were distributed online via emails and social media in November 2017. Non-parametric statistical tests were applied to examine correlations between selected variables. The results showed that the majority of young people consume honey a few times per week or occasionally and their annual consumption is up to 1 kg. The highest consumption is during the winter period and honey is mostly consumed in the morning as a sweetener in beverages. Two interesting dependencies were confirmed. The first correlation was proven between frequency of consumption and healthy eating habits: respondents who consider themselves to be eating healthy have a higher frequency of honey consumption. The second correlation was proven between honey consumption habits during childhood and individual consumption: respondents with higher honey consumption per year used to consume it during their childhood on a regular basis. In conclusion, honey should be promoted among children in order to develop a positive attitude towards its consumption in their early years. The practical implications of the study are related to the possibility to initiate educational campaigns among young generations in Romania, aiming to develop sustainable honey consumption behaviour.

Keywords: *consumer behaviour, honey, Romania, young segment*

JEL Classification: *Q13, M31, D12*

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1   Introduction

Since the dawn of time, people have been using honey as a natural sweetener to obtain energy and strength. However, honey has been appreciated not only for the higher nutrient value, but also due to its healing effects, being widely used as an ointment by many nations (Bogdanov, Jurendic, Sieber & Gallmann, 2008). Honey is considered a concentrated source of glucose and fructose, as well as a source for a rich spectrum of minerals, vitamins, amino-acids and flavonoids (Crittenden, 2011). Therefore, honey has been perceived as an important component in human diet and it is becoming more popular among consumers mainly due to its nutritional properties and benefits (Schifani et al., 2016; Cosmina, Gallenti, Marangon & Troiano, 2015). Motivation for honey consumption is commonly associated with product properties and depends on current trends connected with healthy eating habits (Ismaiel, Kahtani, Adgaba, Al-Ghamdi & Zulail, 2014). However, each consumer may associate honey differently (Stolzenbach, Bredie & Byrne, 2013). According to consumer research in Ireland, besides the product's healthy and nutritional qualities, consumers consider the following attributes: texture, colour, source and price (Murphy, Cowan, Henchion & O'Reilly, 2000).

1.1 Honey Consumption Patterns in Romania

Romanian consumers perceive honey as a natural product with various health benefits and consider its consumption as part of a healthy lifestyle (Pocol & Bolboaca, 2013). Furthermore, the correlation between healthy lifestyle and honey consumption was proven in another Romanian consumer study (Pocol & Ványi, 2012). The existing consumer interest in honey can be explained by the high attention paid to natural products and alternative medicine. Despite the positive attitude towards honey as an alternative sweetener to sugar, the quantity consumed in Romania was low for a certain period of time (Pocol & Marghitas, 2008). Another study in Romania identified honey as a product, which is regularly included in consumers' diet. One third of consumers ate honey once per week or once per month, however the overall honey intake was decreasing at that time (Krystallis, Petrovici & Arvanitoyannis, 2007). According to the National Institute of Statistics in Romania (see Figure 1), there has recently been an increasing trend in annual honey consumption per capita. In 2016, each person consumed 0.94 kg on an average. The survey shows that the annual honeyconsumption for the Macro-region 1, including the Cluj region, has increased over the years.

Figure 1 **Annual honey consumption per capita in Romania**
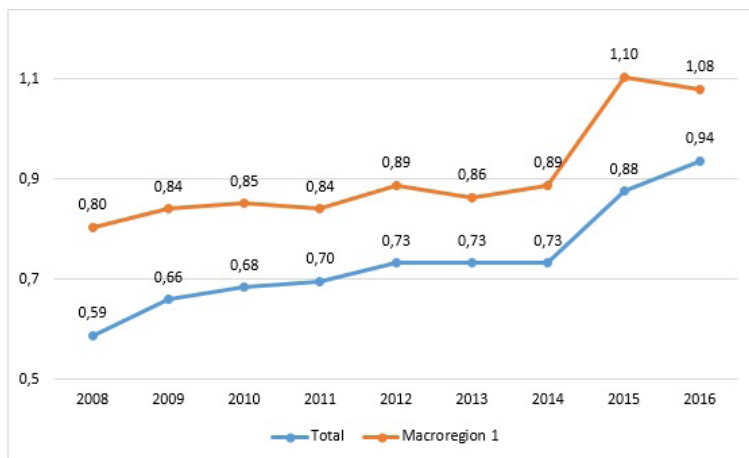
Source: National Institute of Statistics in Romania, 2018.

In addition, the amount consumed depends on consumer age structure. Young people (18 – 30 years) tend to consume lower quantities, while older generations (46 years and older) consume higher quantities. The 32 – 45 age category exhibits "normal" consumption patterns (Pocol & Teselios, 2012). Another study conducted by Pocol (2011) identified a higher honey consumption in case of elderly consumers. Moreover, a higher consumption was revealed in the case of women and in households with children aged younger than 14 years. Lower honey consumption among young consumers presented itself in several countries including the Slovak Republic, Hungary, Poland and the Czech Republic (Guziy, Šedík & Horská, 2017; Vanyi, Csapo & Karpati, 2010; Pidek, 2001; Šánová, Nový, Svobodová & Šeráková, 2015).

The aim of the study was to evaluate the honey consumption behaviour among Romanian young people and to identify consumption patterns in terms of consumption frequency, annual consumption, purpose of use and health aspects.

2   Data and Methods

Consumer behaviour research was based on primary data obtained by conducting questionnaire surveys in Romania. Questionnaires were distributed via social media and emails in November 2017. The research sample has reached 585 respondents by purposive sampling targeted for young consumers (18 – 30 years)

living in the Cluj region. The majority of respondents can be characterised as students with university education living in cities, with a personal monthly income up to 1 800 lei (see Table 1).

Table 1 **Socio – Demographic Profile of the sample N = 585 (%)**

Gender		Occupation	
female	64.8 %	employed	35.6 %
male	35.2 %	maternity leave	3.6 %
Age		entrepreneur	2.4 %
18 - 24 years	67.9 %	unemployed	1.9 %
25 - 30 years	32.1 %	student	56.6 %
Level of Education		**Household structure**	
secondary	21.7 %	with parents	40.9 %
university	78.3 %	with husband/ partner without children	23.1 %
Personal Monthly Income		with husband/ partner with children	7.5 %
up to 1800 lei	66.5 %	alone	28.5 %
1801 – 2700 lei	19.1 %	**Household members**	
more than 2700 lei	14.4 %	1	11.3 %
Residence		2	22.4 %
rural	23.3 %	3 - 4	54.4 %
urban	76.8 %	5 and more	12.0 %

Source: Questionnaire surveys – own processing, 2017.

The results were processed and statistically tested in SAS Enterprise Guide 7.1
The following Statistical methods were used:
Chi-square test of independence
This statistical test is used for testing correlation between two qualitative variables,

$$RCA = RXA = \frac{X_{\bar{y}}/\sum_n X_{nj}}{\sum_k X_{ik}/\sum_k X_{nk}}$$ (1)

where: E_i – empirical frequencies,
T_i – theoretical frequencies,
k – number of columns
m – number of rows

Cramer´s V test measures the strength of the dependencies.

$$RCAi = \frac{Xi - Mi}{Xi + Mi} - \frac{\sum(Xi - Mi)}{\sum(Xi + Mi)}$$ (2)

Coefficients attain values within the<0. 1> interval
- <0, 0.1> represents trivial correlation
- <0.1, 0.3> represents weak correlation
- <0.3, 0.5> represents medium correlation
- <0.5, 1> represents strong correlation (Matejková, Pietriková & Poláková, 2013).

For correlation testing the following hypotheses were formulated:

H1: Socio-demographic determinants have an impact on individual honey consumption per year.

H2: There exists a correlation between honey consumption frequency and healthy eating habits.

H3: There exists a correlation between annual honey consumption per person and intake of honey throughout respondents' childhood.

3   Results and Discussion

The consumption frequency is considered to be one of the most important indicators in the evaluation of consumption patterns. The results of the questionnaire surveys showed (see Figure 2) that the young segment consume honey a few times per week (25.6 %) or occasionally (21.9 %). More than one third consume it once a month or less. The overall honey consumption of young respondents in Romania per year is low. The majority of respondents eat only up to 1 kg per year, where 27.4 % consume only up to 0.5 kg yearly. Approximately 26.7 % consume between 2 to 4 kilograms per year.

Figure 2 **The frequency and quantity of honey consumed**
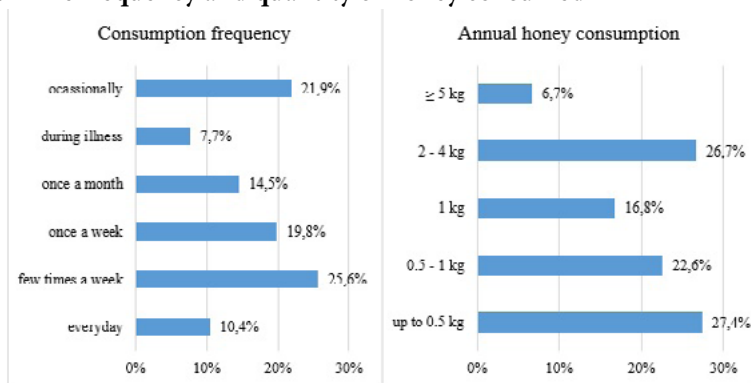
Source: Questionnaire surveys – own processing, 2017.

In the Cluj region, honey is consumed by all family members, as they consume from 2 to 5 kg yearly. The same consumption patterns occurred in Poland, where the young generation consume honey only occasionally and a maximum of 250 grams per month (Żak, 2017). The first hypothesis was formulated in the context of annual honey consumption. It assumes dependences between socio-demographic determinants, which impact on individual honey consumption per year. Due to the nature of the research sample, the following socio-demographic determinants were selected: gender, education, income and place of residence. Based on the results of the Chi-square test of independence, the only dependence confirmed for the significance level ($\alpha = 0.05$) was in terms of gender, exhibiting a weak strength of dependence (Cramer´s V = 0.1551).

Another aspect in the consumption patterns is the period when honey is consumed. Based on the results, the young generation in Romania mostly consume honey in the winter period (43.1 %) or throughout the whole year (32.6 %). Furthermore, the season influences consumer needs and wants. For example, during the festive season, people purchase honey as the ingredient to confectionery products and cakes (Pocol & Marghitas, 2006). During the day, the most frequent consumption is in the morning (39.9 %) or in the evening (22.9 %). Similar results were obtained in the province of Vojvodina, where the majority of consumers eat honey throughout the year and increase consumption in winter (Ćirić, Ignjatijević & Cvijanović, 2015).

Figure 3 **Most frequent period of honey consumption in Romania**
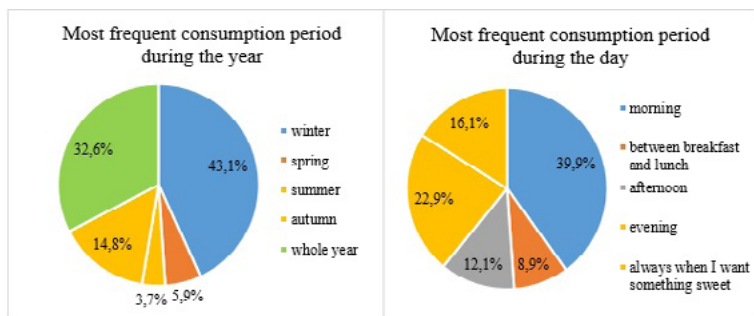
Source: Questionnaire surveys – own processing, 2017.

Honey can be used as food, medicine and in cosmetics, therefore it is perceived by consumers as a multi-purpose product (Addam, Rifai, Naous, Matraji & Mezher, 2017). The results showed (see Figure 4) that honey is mostly used as food (54.9

%) and as medicine (28.9 %), while only few respondents make use of it in cosmetics (5.7 %). Approximately 10 % fully enjoy its multi-functionality. Another study claims that herbal products attract Romanian consumers and therefore, honey is used as remedy by one in five respondents (Arvanitoyannis & Krystallis, 2006). Moreover, increasing attention granted to the health benefits of honey among consumers was proven by Polish research studies, which showed the high interest of consumers towards the topic of honey in medicine (Roman, Popiela-Pleban, Kozak & Roman, 2013). The majority of young consumers in Romania prefer to consume honey in beverages as a sweetener (44.3 %). Another frequent way of consumption is direct consumption (27.4 %) or as a spread (22.7 %). In general, consumers eat honey in combination with other products. The most frequent options are: beverages, spreads, marinades and porridge (Batt & Liu, 2012; Pocol & Marghitas, 2007; Żbikowska, Kowalska, Rutkowska, Kozłowska & Onacik-Gür, 2017).

Figure 4 **Honey purpose of use**
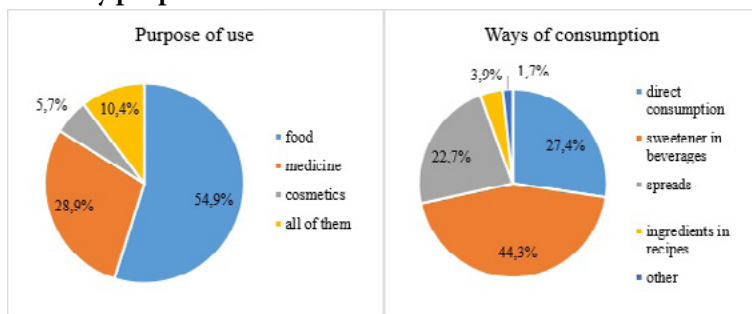
Source: Questionnaire surveys – own processing, 2017.

In the context of honey usage in medicine, the majority of young Romanian consumers know about the healing effects of honey (85.8 %), mostly using it for curing illness on a regular basis (40.7 %) or sometimes (46.2 %). Around 80 % of them increase the consumption of honey during illness. Based on the results, approximately 90 % consider honey healthier than sugar and almost 89 % use it as an alternative sweetener to sugar. Only 10.8 % do not sweeten with honey at all (see Figure 5).

Figure 5 **Health aspect of honey**
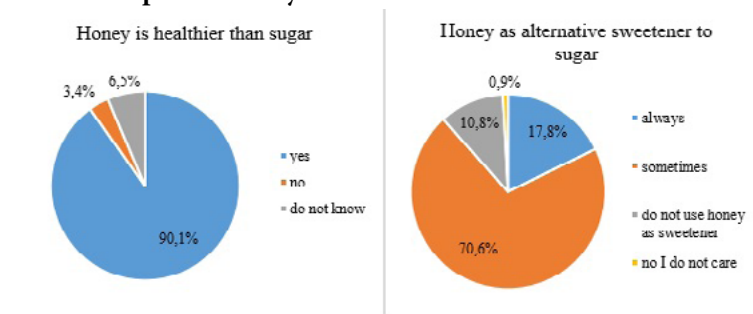
Source: Questionnaire surveys – own processing, 2017.

Figure 7 **Influence of honey consumption during childhood on annual honey consumption**
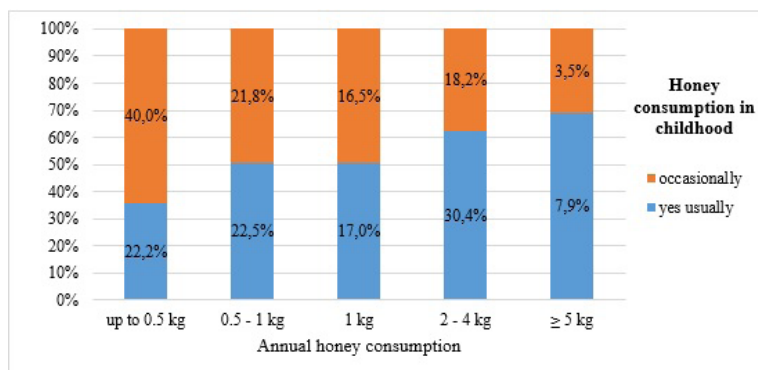
Source: Questionnaire surveys – own processing, 2017.

According to the type of honey, approximately 36 % prefer to consume monofloral honey, 20 % prefer polyfloral honey and 44 % do not have a particular preference. Among monofloral honey varieties, the most preferred one is acacia honey (60.5 %), followed by linden honey (21.2 %). The same results were obtained by Pocol (2012) in questionnaire surveys conducted in the North West Region of Romania, where the majority of respondents preferred acacia, linden and sunflower honey.

4 Conclusion

The study identifies consumption patterns among young honey consumers in the Cluj region and based on the results, several main findings may have outlined:

- The young generation mostly consume honey few times per week or occasionally with annual consumption up to 1 kg. Socio-demographic determinants such as the level of education, personal monthly income and place of residence do not exert a significant influence on respondents' consumption per year. The only impact was proven with the respondents' gender.
- The majority of respondents consume honey throughout the year or in the winter period, both in the morning and in the evening. Honey is consumed by the whole family with annual consumption ranging from 2 to 5 kg. The most preferred type of monofloral honey is acacia and linden honey.
- In general, honey is mostly used as food and medicine, for drinks, spreads and direct consumption. Nearly each respondent considers and uses honey as a healthier sweetener alternative to sugar. The majority of respondents know about its healing effects and use it for curing illnesses.
- Customs and traditions, together with healthy eating habits and lifestyle significantly influence consumption patterns in Romania. The consumers, who consider themselves as having healthy eating habits, consume honey more frequently (H2). Moreover, consumers who used to consume honey on a regular basis during their childhood, consume a higher amount of honey per year in their adulthood (H3).

In conclusion, promoting honey among children at schools and at home, where they should be educated about its benefits and nutritional value, should increase honey consumption for young generation. This approach will establish a good basis for healthy eating habits and ensure a higher consumption of honey in their adulthood.

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PURCHASE OF FOOD VIA THE INTERNET FROM CONSUMER'S POINT OF VIEW

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Abstract

The growing consumer interest in comfort and speed of food purchases can be currently considered as a trend in the food market. The aim of the paper is to point to the food purchase via the Internet in Slovakia. This paper deals with development of food purchase via the Internet and the position of the food in Internet purchases in the Slovak Republic. Secondary data from the database of Eurostat and Slovak Association of Electronic Commerce were used in the processing of the issue. The primary source of information were results of a questionnaire survey aimed at finding out how Slovak consumers perceive food purchase via the Internet. Based on the results, it can be stated that most of Slovak consumers consider pasta and sweets as suitable foods that can be purchased through Internet portals. On the other hand they consider meat and meat products as unsuitable products purchased via the Internet. Slovak consumers evaluate purchase of food via the Internet as advantageous due to the wider range and fast delivery, but on the other hand consumers are still limited by the impossibility to view the goods and relatively high price for delivery of the goods. Nowadays, approximately a quarter of Slovak consumers buy food via the Internet and majority of them use Internet portal of Tesco. Results of the questionnaire survey show that more than 60% Slovak consumers will purchase food via the Internet in the future and we can assume that buying food via the Internet is a perspective and trending area in the current food market.

Keywords: *business, consumer, food, internet, internet shopping*

JEL Classification: *Q 13, M 31, O35*

1   Introduction

Nowadays, consumers are in the middle of the digital revolution and the Internet has a significant impact on their everyday life, lifestyle and the way they make purchasing decisions. In the context of the mentioned, it is possible to assume that new digital technologies affect the thinking and behaviour of each consumer. Customers who buy products in stores are changing to online customers who buy products from comfort of home over the Internet (Miklenčičová, 2015, Grunert, 2017). So buying products via the Internet is one of the most dynamic forms of business development (Ramus & Nielsen, 2005).

1.1   The development of purchase of food via the Internet

Since the late 1990s, online shopping has grown, resulting in an increasing number of consumers buying products through Internet portals (Zhou, Dai & Zhang, 2007). The growth in the number of customers using the Internet for ordering and purchasing products has been increasing steadily over the last ten years. Currently, in the European Union there is 68% of these customers (Eurostat, 2017). The number of users using the Internet for online shopping was lower in the comparison with the average of European Union in the years 2008 to 2015. In the last two years, the pace of development of the number of Slovak customers is faster than the average of European Union, and in Slovakia there is 70% of Internet users regularly buying products online. Based on data from Eurostat (2017) we point out the possible development of the percentage of Slovak consumers buying online with a prediction for the next two years. According to the determination index (R^2), it can be estimated that with 96.95% reliability, the percentage of consumers using the Internet for purchasing products will increase and will reach approximately 80% in the years 2018-2019 in Slovakia.

Figure 1 **Percentage of consumers buying products via the Internet**
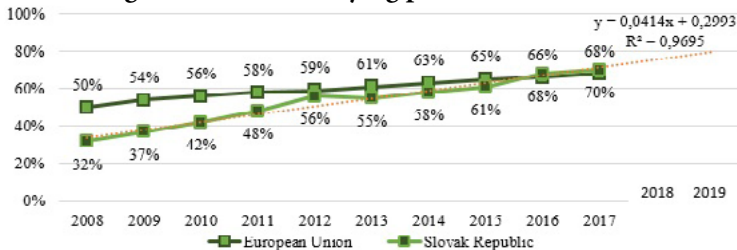
Source: Own processing according to Eurostat, 2017, and SAEC, 2016.

As we mentioned, nowadays consumers can buy every product through Internet portals. Food products are not the exception and their purchase via the Internet is becoming more popular (Hanus, 2016). In connection with the above, it is important to point to the development of the percentage of Internet users purchasing food online. Based on the date from Eurostat (2017), it can be stated that in the monitored period 2008-2017, online purchases of food increased in the countries of the European Union. In the last year, 24% of consumers preferred to order food products via the Internet. In Slovak Republic, only 10 % of Slovak consumers purchased food products by 2015. Since 2016, there has been a rapid increase in the number of consumers buying food products, and currently 25% of consumers buy food online.

Figure 2 **Percentage of consumers buying food via the Internet**
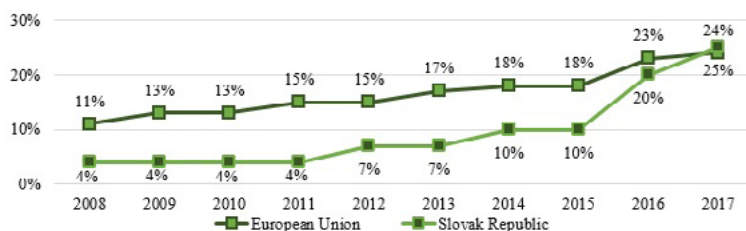
Source: Own processing according to Eurostat, 2017, and SAEC, 2016, own calculations.

Based on the above charts, we can conclude that the number of Internet users buying food through the Internet is gradually increasing, suggesting that Internet portals become an actual and attractive place to buy food products for Slovak consumers.

1.2   Consumer decision to buy food via the Internet

Muhammad, Sujak and Rahman (2016) emphasize that buying food online has the potential to replace traditional food stores in the future. Moreover, sellers who offer food online know the main reasons why consumers buy food via the Internet

1.2.1 Advantages and disadvantages of buying food via the Internet

The possibility of purchasing food products via the Internet brings different benefits to consumers. The most important determinant is the convenience of online shopping. It is necessary to point out that there are different types of

convenience of online shopping, such as access, search, rating, transactions and comfortable operation (Hanus, 2016). We can consider buying time as the next benefit of online grocery shopping. Consumers order food products from the house and save time for traveling, parking and waiting in long checkout queues (Jiang, Yang & Jun, 2013, Huang & Oppewal, 2006). The next advantage of buying food via the Internet is a selection from a wide range of food products (Ramus & Nielsen, 2005).

On the other hand, it is necessary to point out possible barriers that influence consumers in buying food via the Internet. The first major disadvantage is the risk of an incorrect assessment of a particular product. This is a result of the lack of opportunity to taste the product and to perceive its sensory properties (Karpińska-Krakowiak, 2014). Other examples of the disadvantages of online purchase of food can be higher search costs or longer delivery times for products (Verhoef & Langerak, 2001). The fear of buying can be an important determinant that discourages consumers from buying food online. Consumers are afraid of the selection and handling of perishable goods such as vegetables, eggs and meat products. In connection of the above, the online purchase of fresh food is limited due to the date of minimum consumption (Galante, López & Monroe, 2013, Toomey & Wysocki, 2009).

Final decisions about the online purchase of food are influenced by the advantages and disadvantages of buying food via the Internet which are perceived by consumers.

1.2.2 Rational and irrational consumer behaviour in buying food online

Consumers who have chosen an alternative to buying food via the Internet have to make several choices. These choices include selecting a specific Internet portal, taking into account financial aspects, compiling shopping lists and selecting specific brands of food. These can be done by consumers in two ways, based on a rational and irrational approach.

Hanus (2016) and Horská et al. (2009) emphasize that the first approach is connected with the rationality of consumer behaviour. According to this theory, consumers behave rationally, so it means that their goal is to maximize their satisfaction or utility. Consumer behaviour is characterized by cautiousness, awareness, experience, and appreciation of alternatives (Nagyová et al., 2012, Rovný et al., 2010). In the case of buying food via the Internet, consumers compare Internet portals, food prices, payment and delivery terms.

The second approach is related to the irrationality of consumer decisions. Karpińska-Krakowiak (2014) focuses on the factors that limit the optimal

purchasing option. These factors include, for example, uncertainty, risk, limited time and access to information. In the context of mentioned, consumer behaviour is characterized by unpredictability, emotionality, impulsiveness or subconsciousness (Komárková, Rymeš, Vysekalová, 1998). Karpińska-Krakowiak (2014) also emphasizes that a relatively high share of impulses and emotions are recorded when purchasing frequently used products such as food. At present, Internet portals are designed to influence the consumer in order to trigger an instantaneous impulse purchase. These sales methods include, for example, coupons, additional discounts with a short expiration date or a free service such as, for example, delivery.

The consumer's decision to buy food is influenced by a number of factors, including cultural, social, psychological, and personable (Géci, Nagyová & Rybanská, 2017, Nagyová et al., 2012). The behaviour of online shoppers is primarily influenced by psychological factors that can be crucial for repeated purchase of food through the Internet portal. According to Smith and Ruth (2003), the motivational aspect as a psychological factor is to look for and buy a product with higher quality at lower prices through online stores. Motivation encourages consumers to ask questions about regular online food purchases. Another factor is perception. Consumers in the online environment perceive the incentives and objects that are on the Internet portal. For this reason, Constantinides (2004) argues that online marketers should be aware of the elements that increase or doubt the trust of potential customers and should try to understand how trust affects the perception of a particular website by customers on the Internet. Personality also affects the behaviour of consumers on the Internet. In the online environment, consumers may be different personalities in the comparison with their everyday life. The virtual environment gives the individual an opportunity to try different types of personalities or different identities (Schiffman & Kanuk, 2009). The last factor is the emotions that influence consumers, and according to Lakshmi (2016) they may change, depending on the recent experience of buying food online (Horská & Berčík, 2017).

2   Data and Methods

The aim of the paper is to focus on the possibility of purchasing food through Internet portals as a trend in the food market. In connection with its fulfilment, methods of collecting and obtaining information and methods of information processing were used.

Within the scope of data collecting methods we used secondary and primary data. Secondary data represent information from domestic and foreign literature

and web pages focused on processed issues. Primary data were obtained from survey questionnaire conducted on a random sample of 228 respondents in November, December 2017 and January 2018. Respondents were divided into 6 categories by gender, age, education, residence, economic status and monthly income. The classification is shown in Table 1.

Table 1 **The segmentation of respondents from the aspect of selected criteria**

Gender	n	%	Working status	n	%
Men	110	48.25	Student	26	11.40
Women	118	51.75	Employed	116	50.87
Age	n	%	Unemployed	22	9.65
Less than 24 years	66	28.95	Retired	22	9.65
25 – 34 years	40	17.54	Maternity leave	2	0.88
35 – 44 years	40	17.54	Self-employed	40	17.54
45 – 54 years	38	16.67	Monthly income	n	%
More than 55 years	44	19.30	Less than 400 eur	90	39.47
Education	N	%	401 – 700 eur	64	28.07
Elementary	14	6.14	701 – 1 000 eur	40	17.54
Secondary without maturity	40	17.54	More than 1001 eur	34	14.91
Secondary with maturity	80	35.09	Residence	n	%
University	94	41.23	City	138	60.53
			Village	90	39.47

Source: Questionnaire survey, 2018.

Obtained data were processed and analysed in Excel. Furthermore, for hypothesis testing, following statistical tests were applied:
– Chi-Square Test of Independence
– Cramer´V coefficient
– Test of hypothesis for a proportion

In relation to the objective and methods, the following hypotheses were formulated:
– Hypothesis 1: We assume that more than 10% of respondents consider the wider range of food as the main advantage of purchase of food via the Internet.

– Hypothesis 2: We assume that more than 25% of respondents consider the lack of opportunity to view the food before buying as the main disadvantage of online shopping.
– Hypothesis 3: We assume that there is a dependence between the use of the Internet for buying food in the future and the age of the respondents.
– Hypothesis 4: We assume that there is a dependence between the current use of Internet portals for purchase of food and the age of respondents.
– Hypothesis 5: We assume that there is a dependence between evaluating the experience of buying food via the Internet and the respondents' gender.

3   Results and Discussion

In the questionnaire survey, we were interested in how the selected criteria influence consumers and their decision to buy food online. Based on the results we can state that respondents prefer buying food via the Internet, because of the detailed description of the food product, easier search and wider range of products. On the other hand, shop promotion, the possibility of price comparison and the appearance of the website have almost no impact on consumer. During purchasing it is possible to observe both rational and emotional motivational factors in consumer behaviour that influence the decision of the respondents to buy food online.

Figure 3 **The impact of certain criteria on purchasing decisions**
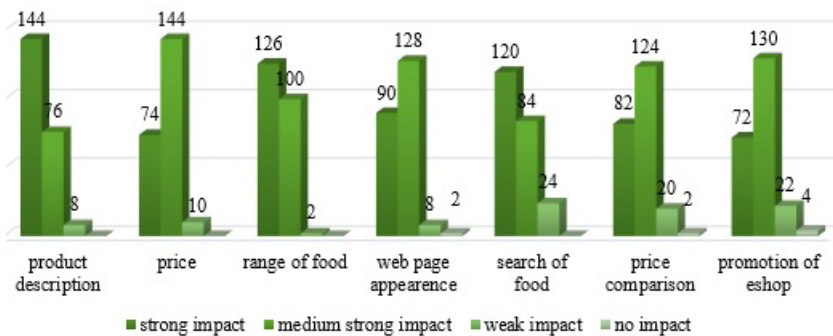
Source: Questionnaire survey, 2018.

The questionnaire survey shows that 68.4% of the total number of respondents consider pasta as a suitable food purchased via the Internet. Of all respondents,

57.9% of respondents consider confectionery as a good product purchased online. 37.7% of respondents would buy dairy products via the Internet. 18.4% of respondents consider fresh bakery products as a good food bought online, 10.5% of consumers consider organic food and healthy food supplements and only 8.8% of respondents consider tobacco products as suitable products to buy online. On the other hand, most respondents stated that they would not buy fish and fish products (59.6%) via the Internet. Other foods that consumers do not consider to be appropriate to buy online are meat and meat products and 61.4% of the total number of respondents would not buy them, 43% of respondents perceive organic food as the least preferred foods purchased online. Frozen foods and healthy food supplements are considered by 38.6% of respondents as not suitable products purchased via the Internet. Hanus (2016) finds meat and vegetables unsuitable for online purchase, due to the high risk of their degradation caused by limited shelf life.

Figure 4 **Food that are suitable and unsuitable for purchase via the Internet**
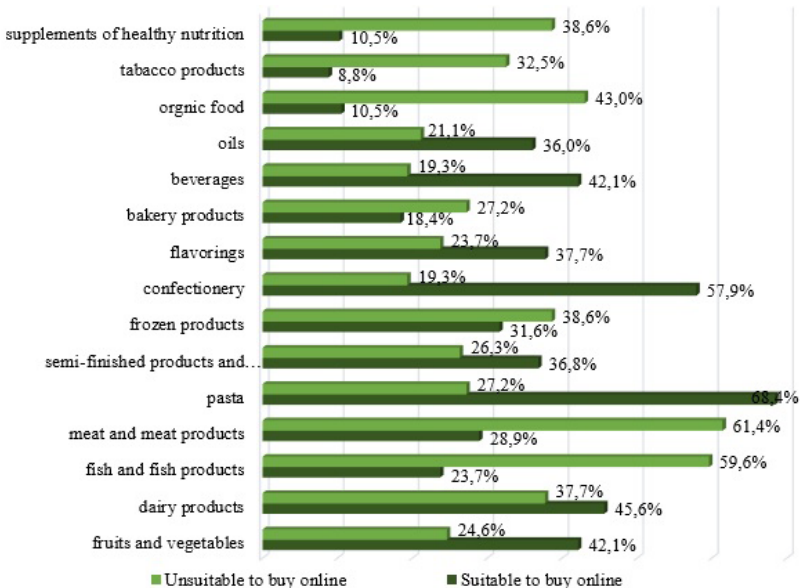
Source: Questionnaire survey, 2018.

Based on the results of questionnaire survey, 17.54 % of respondents consider a wider range of food products and their relatively fast delivery as the most important benefits of buying food via the Internet. 13.15% of respondents perceive

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buying via the Internet as beneficial due to the convenience of buying from home. On the other hand, it is important to note that almost 15% of consumers do not consider Internet shopping to be beneficial and do not perceive advantages of this form of purchase. Grzybowska-Brzezinska and Rudzewicz (2016), based on the results of the survey, concluded that purchasing food from the comforts of home and delivering food products can be considered as the main benefits of online grocery shopping.

Figure 5 **The benefits of purchase of food via the Internet**
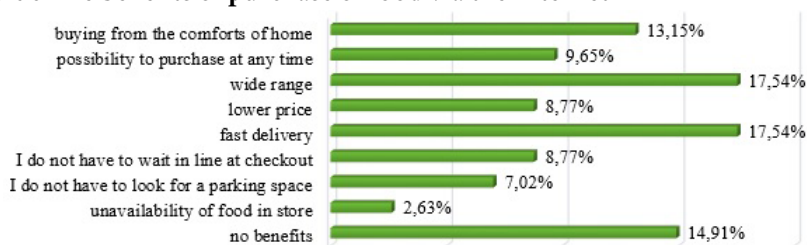
Source: Questionnaire survey, 2018.

In the context of the question, the following hypothesis was formulated and statistical test of hypothesis for a proportion was applied:

H0: It is assumed that 10% of respondents consider the wider range of food as the main advantage of purchase of food via the Internet.

H1: It is assumed that more than 10% of respondents consider the wider range of food as the main advantage of purchase of food via the Internet.

Results showed that p – value (0.175439) is not in confidence interval <0, 0.13268>, therefore the null hypothesis was rejected and it can be concluded that more than 10 % of respondents consider the wider range of food as the main advantage of Internet shopping.

In addition, questionnaire survey was focused on the perceived disadvantages by consumers. Based on the results, 29.82% of respondents do not prefer buying food via the Internet due to the lack of opportunity to view the product. 25.44% of respondents consider a high delivery price as one of the main disadvantages of buying food online. 21.93% of consumers are afraid that food will be delivered after the date of consumption or after the date of minimum durability. Hanus (2016) also considers this risk as a disadvantage of online food purchases.

Figure 6 **The disadvantages of purchase of food via the Internet**

Source: Questionnaire survey, 2018.

In the context of the question, the following hypothesis was formulated and statistical test of hypothesis for a proportion was applied:

H0: It is assumed that 25% of respondents consider the lack of opportunity to view the food before buying as the main disadvantage of online shopping.

H1: It is assumed that more than 25% of respondents consider the lack of opportunity to view the food before buying as the main disadvantage of online shopping.

Results showed that p – value (0.298246) is not in confidence interval <0, 0.297169>, therefore the null hypothesis was rejected and it can be concluded that more than 25% of respondents consider the lack of opportunity to view the food before buying as the main disadvantage of online shopping.

In the issue of the advantages and disadvantages of buying food via the Internet, we have seen the high impact of online consumer perception. On the one hand, we see consumers' trust in Internet sellers in the wide range of food and speed of delivery of food products. On the other hand, there is a fear that food will be delivered after the date of consumption, which represents a significant risk for the consumer.

The purpose of our survey was also to find out if respondents will plan to buy food online in the future. 66.67% of the respondents indicated that they will plan to buy food online via the Internet, and the remaining 32.33% stated that they will prefer buying food in traditional grocery stores. Kitsikoglou, Chatzis, Panagiotopoulos and Mardiris (2014) has made a similar conclusion of research, so consumers will probably change their behaviour and will buy food via the Internet.

Figure 7 **Respondents' opinion on purchase of food via the Internet in the future**

Source: Questionnaire survey, 2018.

Regarding the question of the possibility of buying food via the Internet in the future depending on respondent's age the following hypotheses were formulated:

H0: It is assumed that there is no dependence between the use of the Internet for buying food in the future and the age of the respondents.

H1: It is assumed that there is a dependence between the use of the Internet for buying food in the future and the age of the respondents.

Based on the results of Chi-Square Test of Independence we can conclude, that the calculated value of Chi (14.91) is higher than the table value of Chi (5.99), therefore the null hypothesis was rejected, so age has statistically significant impact on purchase of food products via the Internet. According to Cramer´s V coefficient there is only weak correlation (0.26).

Based on the results of the questionnaire survey we found out that 26.32% of the respondents regularly buy food via the Internet. 58.77% of respondents from the total number of respondents occasionally buy food online. 14.91% of consumers have not had any experience with buying food online yet, and they purchase food in the traditional brick and mortar stores.

Figure 8 **Purchase of food via the Internet**
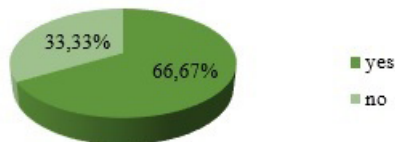
Source: Questionnaire survey, 2018.

In the context of this question, we found the dependence between current food purchases via the Internet and age of respondents and following hypothesis was examined and formulated:

H0: It is assumed that there is no dependence between the current use of Internet portals for purchase of food and the age of respondents.

H1: It is assumed that there is a dependence between the current use of Internet portals for purchase of food and the age of respondents.

Based on the results of Chi-Square Test of Independence we can conclude, that the calculated value of Chi (31.32) is higher than the table value of Chi (9.49), therefore the null hypothesis was rejected, so age has statistically significant impact on the current use of Internet portals for food purchasing. According to Cramer´s V coefficient there is medium correlation (0.31).

Within the questionnaire survey, we were interested in which Internet portals consumers most often to buy food. Only respondents who have ever used online grocery shopping answered the question. Of the total number of these respondents, 50.52% buy food online via Tesco Groceries Home Delivery, 29.89% use Metro's services, 15.46% respondents purchase food at dopo.sk, 4.12% of respondents prefer to buy food online on the website of KORUNA.

The aim of the questionnaire survey was to find out the satisfaction of consumers with buying food via the Internet. More than 56.70% of the total number of respondents have a positive experience with buying food online, 30.92% claim that they have a neutral experience with online shopping, and 12.37% of respondents have a negative experience with this type of shopping. According to the survey conducted by Svatošová (2013), the results showed that 17% of respondents are dissatisfied with online food purchases.

Figure 9 **Experience of respondents with buying food via the Internet**
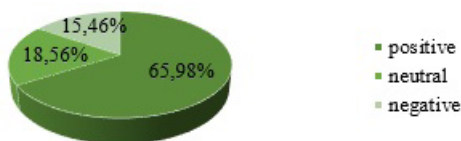
Source: Questionnaire survey, 2018.

In the context of this question, we found the dependence between the gender of respondents and satisfaction with buying food via the Internet and following hypothesis was formulated:

H0: It is assumed that there is no dependence between evaluating the experience of buying food via the Internet and the respondents' gender.

H1: It is assumed that there is a dependence between evaluating the experience of buying food via the Internet and the respondents' gender.

Based on the results of Chi-Square Test of Independence we can conclude, that the calculated value of Chi (0.09) is lower than the table value of Chi (5.59),

therefore the null hypothesis was accepted, it means that gender does not have statistically significant impact on the experience of buying food via the Internet.

4 Conclusion

Nowadays, consumers are looking for a faster and more convenient way to buy food. For this reason, internet portals, which are focused on the sale of food products, have an irreplaceable position on the food market. The objective of the paper was to point out the food purchase via the Internet as a trend that is used by an increasing number of Slovak consumers. Consumers are affected by rational and irrational factors, of which psychological ones are the most important. In the context of online purchases, it is necessary to emphasize online perception and emotions of consumers, which Internet portals use. The results of realised questionnaire survey have shown that consumers are determined by the wide range, the product description and the portal appearance, which can be considered as examples of both groups of factors. Slovak consumers consider fast delivery as the benefit of Internet purchase, and on the other hand they identify the impossibility of seeing the product as the most significant disadvantage. In connection with mentioned, it is important to note that more than 60% of respondents will plan to buy food online in the future, while currently only about 26% of respondents regularly buy food online and use, in particular, Internet portal of Tesco. The majority of consumers have claimed they have a positive experience with buying food via the Internet, which has a significant impact on the emotional side of the consumer's personality, and it is a precondition for repeated online purchases of food in the future. Based on the results, we expect that buying food via the Internet will become popular among Slovak consumers. We also think that more retails will offer food online and online shopping will replace the grocery shopping in the store. This will be possible after the change in the shopping habits of Slovak consumers, which will be formed mostly by the influence of Internet portals acting on the personality side of the consumer. In the future we will monitor these changes in the shopping habits of Slovak consumers and study the further development of food purchases via the Internet.

Acknowledgements

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CONSUMPTION OF THE FRUIT AND VEGETABLE - LUXURY OR NECESSITY IN SLOVAKIA

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Abstract

Fruit and vegetables consumption increases in the Slovakia and the composition of products consumed changes as nations become wealthier. Higher incomes provide consumers with freedom to make purchasing decisions based on factors other than meeting basic caloric needs.

Many studies show a correlation between the level of income and consumption of fruits and vegetables - low-income groups generally consume less fruit and vegetables than higher income groups. High costs likely negatively affect the level of consumption of fruit and vegetables. But not the only low-income groups. Also, people with higher incomes perceive price as a barrier to consumption of these foods. However, it seems that there is a problem more for people with low incomes. Accessibility is therefore likely to be only one of several factors that mitigate the impact of income levels on fruit and vegetable consumption.

The paper presents an analysis of the income the demand for fruits and vegetables, which should be the basis for the development of food policy. In microeconomics, Engel curves are used to describe how the demanded quantity for a particular good or service changes as the income level of the consumer changes.

Keywords: *Fruit, Vegetable, Engel curve, Consumption, Income elasticity*

JEL Classification: *D11, D12, C20*

1   Introduction

Consumer behaviour is a frequently-analysed field in marketing, which aims to predict the consumer behaviour and to obtain information about feelings and preferences based on the physiological changes. We can objectively reveal our inexplicable behaviour to which we are not able to answer using a questionnaire in the traditional market research. An accurate measurement enables marketers to compare the response during research, such as the impact moments associated with a particular product or brand, how they react to different marketing stimuli, noted Horska et al. (2016) and Berčík et al. (2016).

According to data from the Institute of Health Education to only 7.7 percent of people think that they always eat healthily and 42 percent believes that eat mostly healthy. Up to 42 percent of people report that they eat unhealthily. Regularly (daily) consume only 38 percent of fruits and vegetables even only 17 percent of people. Fruits and vegetables have long been an important component of human nutrition. They are characterized by great diversity and variety to please the taste, sensory and olfactory senses. From the professional point of view, highly appreciates the benefits of low power, high contribution of protective substances - vitamins, minerals and trace elements and high in fiber.

1.1   Trends in the Fruit and Vegetable Consumption

In recent years there has been an adverse gradual decline in fruit and vegetable consumption in Slovakia. The consumption of vegetables has decreased over the last 15 years, from 105 kg to 80-85 kg per capita per year. Consumption of fruits decreased from 62 to 51 kg, while domestic consumption falls mainly traditional fruits. Citrus fruits consumption is gradually increasing. Slovakia thus receive only 65-75 percent of the recommended intake of fruit, which is 78-98 kg per person per year.

The graphical analysis, we wanted to highlight the evolution of the consumption of various types of food and also have them graphically compared with the evolution of prices of the main representative of the food groups. Both graphical comparisons were assessed for the same period in Slovakia.

Figure 1 **Consumption of fruits in the years 1990 to 2013 and compared to the recommended daily dose**
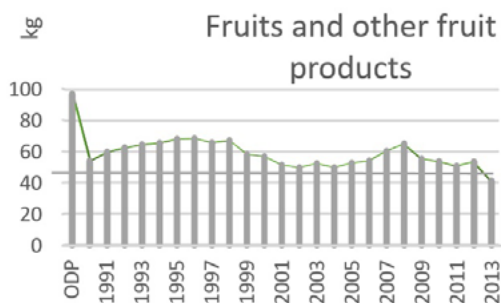
Source: www.statistics.sk, download: 21.1.2014.

Currently, a variety of fruits and vegetables in our market available throughout the year. This applies to both domestic and imported vegetables. Our markets are reaching some species that are not with us are native, and his second home can only receive - for example, Chinese and Beijing cabbage, Chinese celery, fennel salad, eggplant, broccoli, zucchini. Easier situation have gardeners, subsistence, who have the ability to grow their selection according to their own tastes and needs, environmentally friendly. Despite the wider possibilities to achieve intake of fruit, just over three quarters of the recommended consumption.

Intake of vegetables we approach the recommended dose, cases, satisfy the lower limit of normal. Fruit and vegetable intake, however, is unevenly distributed over the year and lack of consumption is reflected especially in winter and spring seasons. From vegetables is absolutely insufficient intake of legumes, whether classic such as peas, beans and lentils, or more traditional such as soybeans and bean. They are a valuable source of protein and fiber of vegetable origin. Their income must increase at least twice. The fruits we must increase the consumption of each species, and in the winter and early spring mainly supply of citrus fruits, which are in our market in a fairly broad range.

Figure 2 **Consumption of vegetables and legumes in the years 1990 to 2013 and compared to the recommended daily dose**
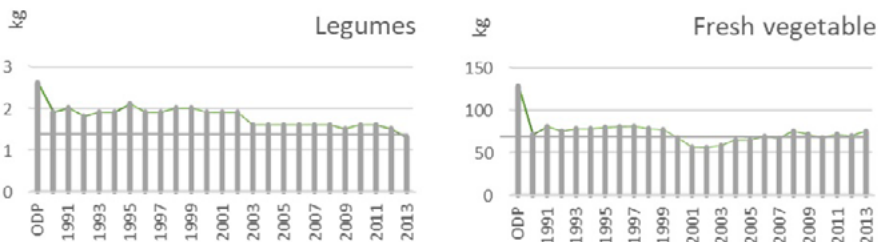
Source: www.statistics.sk, download: 21.1.2014.

Vegetables are among the most difficult commodities in crop production. It results mainly from a large number of species and varieties with different nutritional value and varying difficulty for cultivation, post-harvest treatment, storage and the like.

Vegetables are an important commodity for the National Economy. The share of gross production of vegetable crop production in EUR during the past years is about 14%. Vegetables grown in our conditions are competitive, have comparable, and often better quality parameters in terms of nutritional value, taste characteristics than imported vegetables. Competitiveness of losing our home production after the harvest when there are no adequate facilities for post-harvest treatment, in particular washing, drying, grading, market presentation, packaging, labelling, rapid transport under satisfactory conditions and for storage.

Annual consumption of fresh vegetables to a total of 1 inhabitant reached its highest value in 1997 (80.7 kg). Since 2000, there is a significant drop in consumption due to the low production due to exceptional drought each year. Thus it is not a reversal to a significant increase in consumption.

Health professionals recommended consumption is 127.9 kg together and fresh vegetables 90 kg per capita per year. Permissible interval rational consumption ranges from 116.9 to 138.9 kg, which was achieved in EU countries.

Kubicová (2011) and Moravčíkova et al. (2010) in their research deals with assessing the development of monetary incomes and expenditures of the Slovak households for food using the classification of households by income quartiles and by consumer spending. The analysis confirms the significant differences and unbalanced income distribution. Her research confirms that income differentiation of households is also reflected in their different behaviour in the food market. The demand changes most sensitive to income changes are those of the households with the lowest incomes.

The paper presents an analysis of the income the demand for fruits and vegetables, which should be the basis for the development of food policy.

2   Data and Methods

The paper presents an analysis of the income the demand for fruits and vegetables, which should be the basis for the development of food policy. In microeconomics, Engel curves are used to describe how the demanded quantity for a particular good or service changes as the income level of the consumer changes (Varian, 1996). For this study, we assume that prices are fixed (Lewbel, 2008). This implies that the demanded quantity will be proportional to expenditure, which is the measure usually applied in empirical analyses as has been shown (e.g. Chai and Moneta, 2010 and Ghalwash, 2008, Elfhag, 2008).

We used Engel log-log model, which we investigated estimate elasticities of spending for groups of households by economic status of head of household.

In this paper we analyse the estimation of income and price elasticities using double logarithmic equation for each group of households. Semi-logarithmic specification in many cases proved to be the most appropriate method for estimating the expenditure elasticities of demand. The above specification generates realistic expenditure elasticity, notes in Dawoud's research (2005). Thus, a general model can be written as follows:

$$ln\ w_j = \alpha_j + \beta_j\ ln\ y + \eta_j, \tag{1}$$

w_j where the average annual share of expenditure on food group j per person, α_j and β_j are estimated coefficients, y is the average annual income per person is η_j random error. As mentioned in the previous paragraphs, Engel derivation function is calculated assuming constant prices.

Analysis of the impact of changes in consumer's income is based on indifference analysis. We know that a change in income leads to a shift of the budget line, thereby changing the consumer optimum. To reflect the aforementioned changes, the consumer uses the income curve (ICC). Income consumer curve is the set of combinations of goods for which the consumer maximizes utility at varying income (ceteris paribus). Said curve is the basis for deriving the Engel curve, named after the German statistics Ernst Engel. Engel curve shows the relationship between the optimal consumption of certain goods and consumer income levels, ceteris paribus. Analogous tool for analysing the demand for certain commodities depending on the income Engel expenditure curve, which is defined as a relationship between the consumer spending on his goods and his income.

Sensitivity of the demanded quantity on the changes in income, ceteris paribus, we measure the coefficient of income elasticity. Income elasticity of demand is the ratio of the percentage change in demanded quantity product X to percentage change in income and indicates the percentage by which change demand for product X with changing consumer intake of one percent. For normal goods income elasticity it is positive. Unless our classification of goods deepen, for necessary goods, the change in consumer's income by 1% causes less changes in demand for the farm than 1%. Because the share of the estate to total income is declining, the average propensity to consume is decreasing and true: 0≤Eid≤1.

In the present analysis, we focused on identifying the income elasticity of demand for fruits and vegetables in Slovakia. For the analysis we used data obtained from the Statistical office of the Slovak Republic and the situation and outlook reports of the National Agricultural and Food Centre namely:

- Money income of private households by economic status of head of household at work per person per month in EUR
- Consumption of fruit per person per year in kg (Situation and Outlook Report - Fruit)
- Consumption of vegetables per person per year in kg (Situation and Outlook Report - Vegetables).

3   Results and Discussion

Hupková et al. (2009), Kamphuis (2007) demonstrated analysis of consumer behaviour on the individual household categories level and the subsequent comparison of impact factors on consumer decision will give us an assumption to the complex understanding of the consumer behaviour determinants. They used panel data to estimate the beef meat demand in Slovakia. The data were obtained from the Household Budget Survey of the Slovak Statistical Office. The estimates of price and income elasticities of the beef meat demand were also obtained.

Analysis of the income elasticity, we investigated for different types of households by economic status of head of household - therefore household employees, self-employed household, the household of pensioners and other household goods. For better orientation in terms, it is necessary to characterize the individual types of households as defined by the Statistical Office of the Slovak Republic:

The employee was a person who worked and received an earned income (wages or salary), including persons receiving a pension and earned income (between staff includes members of production cooperatives).

Self-employed (self-employment represents) was a person who worked in their own business, including pensioners with income from business (entrepreneur - with employees and without employees).

Pensioners were jobless person receiving an old-age pension but no income from employment or business (these people were considered workers); household can live and those who do not receive a pension.

Others - all persons not included above (unemployed parents on parental leave, a student and other).

From the perspective of the structure of consumer spending, we have chosen only the expenditure on the group of foods - fruits and vegetables. Analysis of the income elasticity, we investigated for different types of households by economic status of head of household. From Table 1 we can identify that the calculated elasticity is considerably significant. Some fruits have explained the variability around 0 it some fruits are up to 75%. This item can be observed high variability values. Sign elasticities take the positive and negative values. An interesting finding is that the elastic modulus of the fruit together is almost all groups of households characterized as inferior goods.

After seeing the table elasticities for households of employees we found that all types of fruit are for this type of domestic goods deemed necessary, in addition to grapefruits, which are regarded as inferior beasts. This means that all the food groups with a value between $0 \leq \beta \leq 1$ is for Slovak households of employees necessary. If consumer income changes by 1% causes a change in demand for the farm less than 1%.

Table 1 **Income elasticity of fruit in private households by economic status of head of household at work**

Eid	Employee					Self-employed				
	alfa	Beta	Eid	R2	Prob	alfa	beta	Eid	R2	Prob
fruit together	5,95	-0,04	inferior good	0,00	0,84	5,94	-0,03	inferior good	0,00	0,85
apples	4,69	0,39	necessary good	0,46	0,02	4,92	0,32	necessary good	0,49	0,02
pears	5,70	0,09	necessary good	0,61	0,00	5,75	0,07	necessary good	0,61	0,00
plums	5,79	0,17	necessary good	0,08	0,41	5,82	0,10	necessary good	0,04	0,54
cherries	6,03	0,20	necessary good	0,08	0,39	5,95	0,11	necessary good	0,04	0,56
cherries	5,49	-0,17	inferior good	0,27	0,10	5,62	-0,12	inferior good	0,20	0,17
apricots	5,82	0,04	necessary good	0,02	0,67	5,84	0,03	necessary good	0,02	0,65
peaches	4,88	0,98	necessary good	0,60	0,01	5,11	0,76	necessary good	0,59	0,01
currants	5,87	0,04	necessary good	0,02	0,68	5,88	0,03	necessary good	0,02	0,67
strawberry garden	5,78	0,30	necessary good	0,40	0,04	5,81	0,23	necessary good	0,39	0,04
grape	5,16	0,51	necessary good	0,37	0,05	5,32	0,40	necessary good	0,38	0,04
orange	5,30	0,24	necessary good	0,15	0,23	5,43	0,19	necessary good	0,16	0,22
tangerines	5,23	0,40	necessary good	0,17	0,21	5,28	0,38	necessary good	0,25	0,12
lemons	5,55	0,40	necessary good	0,17	0,21	5,67	0,25	necessary good	0,11	0,32
grapefruit	5,95	-0,42	inferior good	0,31	0,08	5,94	-0,32	inferior good	0,29	0,09
bananas	4,65	0,56	necessary good	0,25	0,11	4,92	0,44	necessary good	0,26	0,11
kiwi	5,78	-0,34	inferior good	0,51	0,01	5,81	-0,24	inferior good	0,42	0,03

Eid	Pensioners					Others				
	alfa	beta	Eid	R2	Prob	alfa	beta	Eid	R2	Prob
fruit together	6,34	-0,13	inferior good	0,04	0,55	5,44	0,00	necessary good	0,00	0,99
apples	5,67	0,13	necessary good	0,73	0,00	4,71	0,26	necessary good	0,14	0,26
pears	4,26	0,55	necessary good	0,58	0,01	5,35	0,08	necessary good	0,29	0,09
plums	5,80	0,17	necessary good	0,05	0,51	5,42	0,18	necessary good	0,06	0,47
cherries	6,03	0,20	necessary good	0,05	0,50	5,65	0,19	necessary good	0,05	0,49
cherries	5,43	-0,21	inferior good	0,25	0,11	5,06	-0,20	inferior good	0,26	0,11
apricots	5,83	0,07	necessary good	0,04	0,56	5,45	0,03	necessary good	0,01	0,81
peaches	4,85	1,03	luxusný tovar	0,43	0,03	4,48	1,02	luxury good	0,46	0,02
currants	5,95	0,09	necessary good	0,06	0,49	5,40	-0,03	inferior good	0,01	0,81
strawberry garden	5,79	0,29	necessary good	0,25	0,12	5,40	0,38	necessary good	0,46	0,02
grape	5,08	0,58	necessary good	0,32	0,07	4,86	0,46	necessary good	0,21	0,15
orange	5,35	0,22	necessary good	0,09	0,38	4,54	0,42	necessary good	0,34	0,06
tangerines	5,17	0,45	necessary good	0,14	0,26	4,94	0,35	necessary good	0,09	0,37
lemons	5,41	0,64	necessary good	0,29	0,09	5,31	0,21	necessary good	0,03	0,59
grapefruit	6,03	-0,61	inferior good	0,43	0,03	5,57	-0,37	inferior good	0,17	0,21
bananas	4,75	0,51	necessary good	0,14	0,26	3,97	0,70	necessary good	0,29	0,09
kiwi	5,78	-0,37	inferior good	0,41	0,03	5,40	-0,42	inferior good	0,56	0,01

Source: Own calculations, data obtained from VUEPP and the Statistical Office.

Table 2 **The income elasticity vegetables in private households by economic status of head of household at work**

Eid	Employee					Self-employed				
	alfa	Beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
vegetables together	-2,50	1,82	luxury good	0,74	0,001	-0,28	1,34	luxury good	0,65	0,003
tomatoes	2,26	1,27	luxury good	0,29	0,091	3,17	0,95	necessary good	0,26	0,107
onions	4,51	0,60	necessary good	0,31	0,073	4,91	0,43	necessary good	0,26	0,106
Garlic	5,81	-0,22	inferior good	0,18	0,192	5,83	-0,16	inferior good	0,17	0,213
Cauliflower and broccoli	5,32	0,40	necessary good	0,16	0,215	5,46	0,31	necessary good	0,16	0,221
tusk	5,83	-0,03	inferior good	0,00	0,876	5,82	0,03	necessary good	0,00	0,843
cabbage	6,74	-0,34	inferior good	0,06	0,462	6,72	-0,33	inferior good	0,09	0,364
salad	5,74	0,36	necessary good	0,75	0,001	5,78	0,28	necessary good	0,72	0,001
A carrot	2,69	1,32	luxury good	0,68	0,002	3,44	1,01	luxury good	0,65	0,003
parsley	5,67	0,19	necessary good	0,04	0,565	5,76	0,09	inferior good	0,01	0,720
celery	5,77	0,33	necessary good	0,43	0,028	5,80	0,27	necessary good	0,49	0,017
Cucumbers	4,44	0,68	necessary good	0,52	0,012	4,86	0,48	necessary good	0,43	0,028
peas	5,84	0,07	necessary good	0,04	0,537	5,85	0,04	necessary good	0,02	0,665
Bean	6,04	0,38	necessary good	0,46	0,021	6,02	0,30	necessary good	0,48	0,018
Red pepper	4,00	0,99	necessary good	0,75	0,001	4,53	0,71	necessary good	0,64	0,003
spinach	6,02	0,12	necessary good	0,18	0,195	6,00	0,09	necessary good	0,18	0,193
kohlrabi	5,53	0,24	necessary good	0,11	0,328	5,61	0,19	necessary good	0,11	0,324
melons	3,84	1,16	luxury good	0,61	0,004	4,25	0,93	necessary good	0,65	0,003

Eid	Employee					Self-employed				
	alfa	Beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
Other vegetables, including mushrooms	4,335	0,644	necessary good	0,50	0,015	4,73	0,48	necessary good	0,46	0,022

Eid	Pensioners					Others				
	alfa	beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
vegetables together	-4,63	2,29	luxury good	0,77	0,000	-3,34	1,92	luxury good	0,58	0,006
tomatoes	1,31	1,61	luxury good	0,30	0,079	2,03	1,22	luxury good	0,19	0,185
onions	4,08	0,80	necessary good	0,37	0,047	4,31	0,52	necessary good	0,17	0,206
Garlic	5,82	-0,33	inferior good	0,28	0,097	5,44	-0,07	inferior good	0,01	0,732
Cauliflower and broccoli	5,36	0,37	necessary good	0,10	0,354	4,66	0,64	necessary good	0,30	0,081
tusk	5,80	0,04	necessary good	0,00	0,863	5,54	-0,17	inferior good	0,06	0,470
cabbage	6,37	-0,20	inferior good	0,01	0,725	6,93	-0,55	inferior good	0,11	0,314
salad	5,75	0,41	necessary good	0,63	0,004	5,36	0,46	necessary good	0,84	0,000
A carrot	2,31	1,49	luxury good	0,56	0,008	1,94	1,49	luxury good	0,61	0,005
parsley	5,56	0,34	necessary good	0,08	0,388	5,26	0,24	necessary good	0,04	0,538
celery	5,77	0,41	necessary good	0,45	0,023	5,41	0,28	necessary good	0,23	0,134
Cucumbers	4,21	0,80	necessary good	0,48	0,018	3,68	0,88	necessary good	0,62	0,004
peas	5,87	0,14	necessary good	0,12	0,291	5,44	-0,03	inferior good	0,01	0,802
Bean	6,15	0,53	necessary good	0,60	0,005	5,66	0,36	necessary good	0,29	0,084
Red pepper	3,57	1,22	luxury good	0,77	0,000	3,40	1,11	luxury good	0,68	0,002

Eid	Pensioners					Others				
	alfa	beta	EiD	R2	Prob	alfa	beta	EiD	R2	Prob
spinach	6,15	0,19	necessary good	0,30	0,081	5,54	0,05	necessary good	0,03	0,627
kohlrabi	5,46	0,31	necessary good	0,11	0,308	5,12	0,27	necessary good	0,10	0,346
melons	3,55	1,33	luxury good	0,54	0,010	3,36	1,22	luxury good	0,48	0,017
Other vegetables, including mushrooms	4,12	0,74	necessary good	0,44	0,026	3,79	0,72	necessary good	0,44	0,025

Source: Own calculations, data obtained from VUEPP and the Statistical Office.

After seeing the table elasticities for households of employees we found that all types of fruit are for this type of domestic goods deemed necessary, in addition to grapefruits, which are regarded as inferior beasts. This means that all the food groups with a value between $0 \leq \beta \leq 1$ is for Slovak households of employees necessary. If consumer income changes by 1% causes a change in demand for the farm less than 1%.

A similar situation occurred in the households of self-employment. In households of pensioners introduced some changes. There were more in the results elasticities inferior goods: cherries, grapefruit and kiwi. We even identified one luxury goods: peaches. Other households may be considered in terms of socio-economic group most sensitive households. Basically it follows the demand-driven behaviour of households of pensioners, in addition to the added downgraded farmhouse and currants.

When inferior holdings of demand falls with increasing income. Is not necessarily of inferior homestead, crucial to consumer preferences (so benefits which it brings farmhouse).

From Table 2, we can identify that most of the calculated elasticities are significantly significant. Some vegetables have variability explained about 0 certain types of it are up to 77%. (Indicator R2) In this item, we can observe a high variability values. Sign elasticities take the positive and negative values. An interesting finding is that the value of elasticity for the vegetables together with all groups of households characterized as luxury goods.

After seeing the table elasticities for households of employees we found that tomatoes, melons and carrots can be characterized as luxury goods. Inferior goods

are garlic, cabbages. Other types of vegetables are for this type of domestic goods deemed necessary. This means that all the food groups with a value between $0 \le \beta \le 1$ is for Slovak households of employees necessary. If consumer income changes by 1% causes a change in demand for the farm less than 1%.

A similar situation occurred in the households of self-employment. In households of pensioners introduced some changes. Tomatoes have changed the status of a luxury farmhouse for self-employment are essential goods. In the results elasticities inferior goods also changes occurred: garlic, cabbage and parsley.

Pensioner households have more luxury goods: tomatoes, carrots, peppers and melons. The farmhouse is inferior cabbage and garlic. It can be deduced that those types of vegetables, consumers are able to grow, eventually buy from the nearest farmer. Other households may considered in terms of socio-economic group most sensitive households. Basically follows the demand-driven behaviour of households of pensioners, in addition to a downgraded farmhouse he joined the games.

4   Conclusion

When inferior holdings of demand falls with increasing income. Is not necessarily of inferior homestead, crucial to consumer preferences (so benefits which it brings farmhouse).

Fruit and vegetables consumption increases and the composition of products consumed changes as nations become wealthier. Higher incomes provide consumers with freedom to make purchasing decisions based on factors other than meeting basic caloric needs.

Many studies show a correlation between the level of income and consumption of fruits and vegetables - low-income groups generally consume less fruit and vegetables than higher income groups. We will try to describe causes of this situation.

High costs likely negatively affect the level of consumption of fruit and vegetables. But not the only low-income groups. Also, people with higher incomes perceive price as a barrier to consumption of these foods. However, it seems that there is a problem more for people with low incomes. Accessibility is therefore likely to be only one of several factors that mitigate the impact of income levels on fruit and vegetable consumption.

Adults with higher education consume more vegetables evaluated in the survey EUFIC Council (2012). In addition to the financial aspect just mentioned - higher education generally means higher income - this may be associated with better knowledge and awareness of healthy eating habits in people with higher

levels of education. It is likely that our eating habits, including the consumption of fruit and vegetables were affected by certain values, ideals and social impact, which is linked to education and income levels.

The reason the low-power state experts low income families. The survey confirmed that low-earning people eat less fruit than those more solvent. Therefore Slovak families cannot afford to buy fruit that is less energy value. They vote more meat, bread. It confirmed to us that the fruit is necessary for Slovaks and in some cases inferior, but on the other vegetables are considered luxury goods. That´s the very interesting paradox of the aggregated data. New knowledge is fact that we cannot confirmed that the Slovaks have a really low income levels. More sensible group are pensioners and other type households.

Acknowledgements

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FACTORS AFFECTING CONSUMER BEHAVIOUR IN CASE OF MEAT WITH AN EMPHASIS ON THE PRICE

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Abstract

Meat is very important for human nutrition. From a health point of view, it is valuable for the content of essential proteins and substances that build the organism. Meat is part of human nutrition and is an important element of our diet. It contains essential amino acids, fats, mineral salts, B vitamins, and trace elements such as iron, copper, manganese, zinc, selenium. Each type of meat has a different composition, the ratio of the individual components varies depending on the age, breed and species of the animal. For pure muscle is the composition of meat as follows: water (70-75%), protein (18-22%), fats (2-3%), minerals (0.9-1.2%). Meat quality depends not only on the content of full-bodied proteins, digestibility, consistency but also on maturity, storage and preparation.

The main purpose of the proposed paper is to determine relevant factors which influence consumer meat buying preferences. The emphasis in the performed analysis was especially on the influence of price on different categories of customers. In our research, we examine four basic factors: price, quality, brand and country of origin. Data were obtained using an online questionnaire survey.

First, respondents were asked to rank different factors, which influence their preference when buying meat products. Among four factors: quality, country of origin, price and brand was price ranked as the third most important. Factors which are more important for the respondents when buying meat are quality and country of origin. On the other side, factor labelled by respondents as the least important was brand. Result suggest that frequency of consumption and education of respondents is not related with their sensitivity to price changes. On the other side, gender, age, income and economic activity are significantly related to customers´ sensitivity on price changes. Strongest relationship was recorded in the case of age and economic

activity. Based on the result of performed analysis it can be concluded, that categories influenced the most by the meat price change are females, with low income, which are employed or retired, in the age 19-25 or age category over 46 years. Category of people least influenced by price when buying meat are males, with high income in the age 26-45 years.

Keywords: *Meat consumption, Factors influencing customers, Meat price, Questionnaire survey*

JEL Classification: *L660, C140*

1   Introduction

Meat and meat products currently represent an important source of protein in the human diet. Consumers are the final step in the production chain, it is useful to identify which factors affect their behaviour. This would allow the meat sector to better satisfy consumer expectations, demands and needs. This article focuses on factors that could influence consumer behaviour, preferences and their perception of meat and meat products

Meat and meat products are an important source of protein in human diets, and their consumption depends on socio-economic factors, ethics or religious beliefs, and tradition. Globally, pork is consumed the most (15.8 kg/capita/year), followed by poultry (13.6 kg/capita/year), beef (9.6 kg/capita/year) and finally sheep and goat meat (1.9 kg/capita/year) (FAOSTAT, 2014). Consumers are the last step in the production chain, and having their expectations met is an important part of their satisfaction and shopping behaviour. It is important to understand the factors affecting consumer behaviour. In this article we will divide the issues that explain these factors into these types: price, gender, age and knowledge. The following general and theoretical overview of the aspects will be examined to better understand marketing variables, which are presented afterwards via specific examples.

Everybody has expectations for something in daily life that affect personal reactions and decisions, although sometimes subconsciously (Deliza & MacFie, 1996). Expectations play an important role in the acceptance or rejection of a product, concept, fact or event because they may alter its perception and image even before its test or occurrence. In general, higher expectations imply higher customer requirements and exigencies and accordingly imply a higher likelihood of dissatisfaction and disappointment. As stated by Deliza, MacFie, Feria-Morales, and Hedderely (2000), the expectation formation process starts with the previous information and experiences that will constitute our prior expectations.

These prior expectations together with the informational cues available at the shopping place (e.g., the product itself, its package, appearance, label, context, advertising or price) will generate new expectations. If these new created expectations are low, the product will probably be rejected, but if expectations are high the product is very likely to be chosen and purchased.

In general, consumers have substantial difficulties in forming quality expectations, especially for fresh meat for which little information about the product is normally provided. According to Grunert, Bredahl, and Brunsø (2004), the formation of meat quality expectations is based on a few key clues, principally labelling (including price) and appearance, which do not seem to be very good predictors of its eating quality. Meat flavour is very complex, and it is created mainly when meat is treated thermically because raw meat has only a bloody taste and very little aroma (Mottram, 1998).

Price is an important extrinsic quality cue related with consumers' purchasing decisions, but though it has a positive effect on expected quality (Bello Acebrón & Calvo Dopico, 2000), its relationship with actual eating quality is not clear and it is affected by demographic characteristics. Some studies showed that lamb price was the most important factor, compared with safety, quality, traceability and origin (Du Plessis & du Rand, 2012). Other studies have shown that lamb and beef price was the least important attribute affecting purchasing intention when compared with country of origin and feeding system, although a minority of consumers considered price the most important factor on purchasing intention, with the lowest (or in some cases medium) price being the most preferred (Font i Furnols et al., 2011; Realini et al., 2013). Similar results in beef were found when price was compared with production system, origin and quality label and in lamb (Bernabéu & Tendero, 2005), when price was compared with type of lamb, origin and certification. Thus, although price seems not be the most important attribute when purchasing, usually lower prices are preferred and are probably especially important for a segment of consumers with low purchasing power or those for whom meat characteristics or type is not an important issue. In fact, high price is one reason that can explain, for instance, the low consumption of lamb in some countries where it is highly priced (Nagyova 2014, Paluchova, Benda Prokeinova 2013).

2   Data and Methods

Data were collected using online questioner survey including 1103 respondents. Data were processed and analysed to identify important factors influencing consumers´ preferences. In the proposed analysis was the emphasis especially on

the influence of the price. In the first part of questionnaire respondents´ ranked factors according their influence on customers behaviour. In the second part, respondents´ answer to question if they perceived price change in recent period was related with their attributes. For the investigation of differences between influence of considered factors was used Friedman test and post hoc Nemenyi procedure. Perception of the price and its relationship with respondents' characteristics was analysed using chi-square test of independence and pearson´s contingency coefficient.

2.1 Friedman test

Friedman test is a non-parametric alternative to the repeated measures ANOVA where the assumption of normality is not acceptable. Usually it is used in case of ordinal dependent variable. This occurs especially in case of questioner survey, when each respondent assesses more than two products using the same scale. In case of Friedman test applications should be met following conditions:
1. One group that is measured on three or more different occasions
2. Group is a random sample from the population
3. Dependent variable should be measured at the ordinal or continuous level
4. Samples do not need to be normally distributed

If the M is the position parameter for sample I, then hypothesis for the Friedman test are as follows:
- H_0: $M_1=M_2=\ldots=M_k$
- H_a: There is at least one pair (i,j) such that $M_i \neq M_j$

Test statistics is defined:

$$RXA = \left(\frac{X_{ij}}{\sum_{l,l\neq j} X_{ij}}\right) / \left(\sum_{k,k\neq i} X_{kj} / \sum k, k \neq i \sum_{l,l\neq j} X_{kl}\right) \tag{1}$$

Where k=the number of groups (treatments), m=the number of subjects, R_j is the sum of the ranks for the jth group. Test statistics follows chisquare distribution with k-1 degrees of freedom. If the test statistics is higher than critical value, H0 is rejected otherwise it is accepted.

If the result of the test is rejection of the null hypothesis, then should be applied Nemenyi method of multiple comparison to identify significant differences comparing each pair of treatment.

2.2 Nemenyi method

This method is based on the Kruskal-Wallis method of ranking in a one-way classification and was proposed by Nemenyi (1963).

The critical distance for the Nemenyi test is calculated:

$$EMS = \frac{\text{export of one sector (agriculture or food industry)}}{\text{total export of all sectors of all European Union countries}} \tag{2}$$

Where α is the confidence level, K is the number of treatments and N is the number of measurement. To calculate $q_{\alpha,K}$ is used the Studentised range statistics for infinite degrees of freedom divided by square root of 2. Every difference exceeding critical distance is evaluated as significant.

2.3 Chi-square test of independence

To investigate relationship between categorical variables was used chi-square test of independence. Hypothesis for this test are as follows:

H_0: In the population, the two categorical variables are independent

H_1: In the population, two categorical variables are not independent

This method is based on the comparison of observed and expected frequency in the pivot table.

Expected frequency can be calculated:

$$EN = \frac{Revenues}{Costs} \tag{3}$$

Where n_i is the sum of ith column, n_j is the sum of jth row and n is the sample size. Test statistics has form:

$$EN = \frac{Yields}{Costs} \tag{4}$$

Where $O_{i,j}$ observed value of two nominal variables, $E_{i,j}$ expected value of nominal variables.

Test statistics follows chi-square distribution with (r-1)*(c-1) degrees of freedom. If test statistics exceeds critical value, H0 is rejected. It means that two categorical variables are not independent. In such case can be the strength of relationship between variables measured by Pearson´s contingency coefficient:

$$\acute{U} = \frac{VN}{P} \tag{5}$$

Where: $\acute{U} = \dfrac{VN}{(P + D)}$ is the test statistics value from chi-square test of independence and n is the number of respondents. If the coefficient value is close to 1, it would mean strong relationship between categorical variables, if the coefficient value is close to 0 it would mean weak relationship between variables.

3   Results and Discussion

Data were collected using internet questionnaire survey. Structure of respondents is shown on the figure 1 and 2. Most of the respondents were females 72,5%. Age structure of the panel better corresponds to population structure. Category 26-45 years had 43% share, the most common category 46-65 years had 45% share and the least represented category had 12% share.

Figure 1 **Gender and age of respondents**
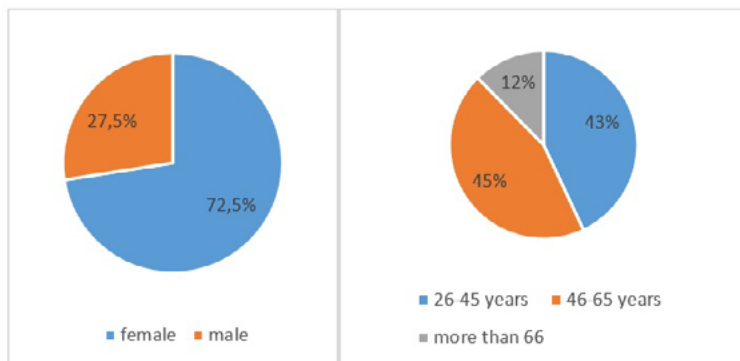
Source: Authors´ work.

Important factors regarding respondents´ preferences are also their income and education. Most of the respondents had university education (56%), 41% of respondents had university education and only 3% was respondents with basic education. Most represented income category were respondents earning 501-700€ (35%) and respondents earning less than 500€ per month (24%). Income category 701-900€ was represented by 22% of respondents. Least represented category were respondents with income 1101-1300 with 4% share.

Figure 2 **Income and education of respondents**
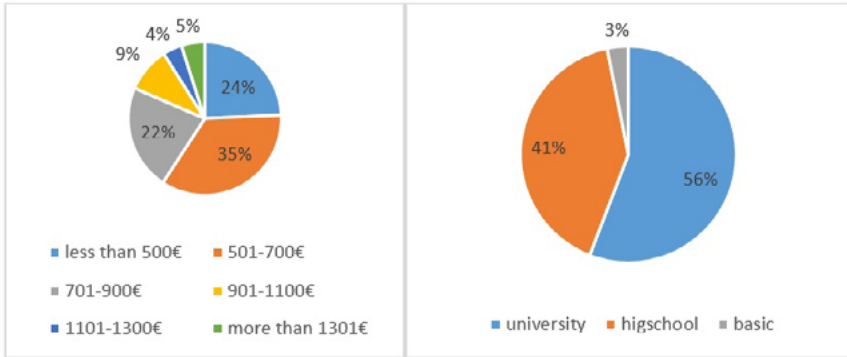
Source: Authors´ work.

The main objective of proposed paper was determination of factors which influence respondents´ preferences related to meat. The accent was on price and its role in customer decision when buying meat. First, the price was compared with other important factors influencing customer preferences, in the next step of conducted analysis was investigated, which socioeconomic parameters of respondents influence their perception of price change.

In the first step was compared influence of four factors: quality, price, country of origin and brand. Respondents evaluated each of them using scale from 1 (the most important) to 5 (least important). Collected data were compared using Friedman´s test. This test was selected due to dependent nature of compared samples. Result of Friedman´s test is shown in table 1. Test statistics was 998,6731 with p-value <0,0001. This result suggests rejection of the null hypothesis. In this case it means significant difference in the influence of compared factors.

Table 1 **Result of Friedman´s test**

Friedman's test:	
Q (Observed value)	998,6731
Q (Critical value)	7,8147
DF	3
p-value (Two-tailed)	< 0,0001
alpha	0,05

Source: Authors´ work

Result of Friedman´s test proved only significant difference between compared factors. To identify which factors differs at most, and if all the factors are different, or only one of them is different was applied further post hoc procedure. In case when was applied Friedman test to indicate significant difference Friedman´s test is the appropriate method to identify these differences Nemenyi´s procedure. This procedure compares mean rank of each category, and test for significant differences between these ranks. Results of this procedure can be found in table 2 and table 3. Factors evaluated as the most important were quality and country of origin. Quality had lowest mean of ranks which made it the most important factor influencing preferences influencing shopping of meat. As the least important factors were evaluated Brand and price. This was in contrast with expectation that price will be the key factor. Lowest variability in the answers of respondents was in case of country of origin. It means, that in this case was the strongest agreement of respondents about influence of this factor. The highest differences in the evaluation of factor was in case of Brand. This factor can be denoted as the most subjective factor.

Table 2 **Comparison of the factors influencing meat preferences**

Factor	Mean of ranks	Std. deviation	Groups
Quality	1,6356	0,9703	A
Country of origin	2,3918	0,6642	B
Price	2,6640	1,0035	C
Brand	3,3086	1,1036	D

Source: Authors´ work.

The highest difference was between quality and brand. The smallest difference was between country of origin and price. Difference in each compared pair of factors was higher than critical difference 0,14. It means that difference in each compared pair of factors was significant. Result of this analysis proved that price is not as important as was expected when it is compared with other factors. Respondents expects quality on the first place with less accent on quality and brand.

Table 3 **Difference in each pair of factor**

	Price	Quality	Brand	Country of origin
Price	0	1,0284	-0,6446	0,2722

	Price	Quality	Brand	Country of origin
Quality	-1,0284	0	-1,6730	-0,7562
Brand	0,6446	1,6730	0	0,9167
Country of origin	-0,2722	0,7562	-0,9167	0
Critical difference: 0,1481				

Source: Authors´ work.

On the other side, previous finding was general, in case when respondents compared price with other factors. Despite of this result can be expected, that price still plays an important role in customers´ decision. This was evaluated by the respondents´ answer to question if they noticed price change in recent time. Next step of conducted analysis was the identification of factors which influence perception of price change. In other words, what are the factors influencing how important is price for the respondents. In the analysis were considered following factors: frequency of meat consumption, gender, age, economic activity, income and education. Relationships between qualitative variables were investigated using chi-square test of independence. Results of this test with p-values and Pearson´s Phi coefficient is shown in table 4. In case of education and frequency of meat consumption was not identified significant relationship. According to results of conducted analysis have significant influence on the perception of price change gender, age, economic activity and income (p-value less than 0,05). According to Pearson´s coefficient is the perception of the price the most influenced by age and economic activity of respondents.

Table 4 **Difference in each pair of factor**

perception of price change	frequency of consumption	gender	age	Economic activity	Income	Education
pvalue	0,5701	0,0458	< 0,0001	< 0,0001	< 0,0001	0,1625
Pearson's Phi	0,0944	0,0799	0,2749	0,2693	0,1944	0,0823

Source: Authors´ work.

Significant influence of gender is shown on the figure 3. Most of females replied, that cannot say, or that they significantly perceive price changes. Share of

females influenced by price is significantly higher than in case of males. It means that females are more affected by price changes and perceive it more sensitively than males.

Figure 3 **Influence of price on different genders**
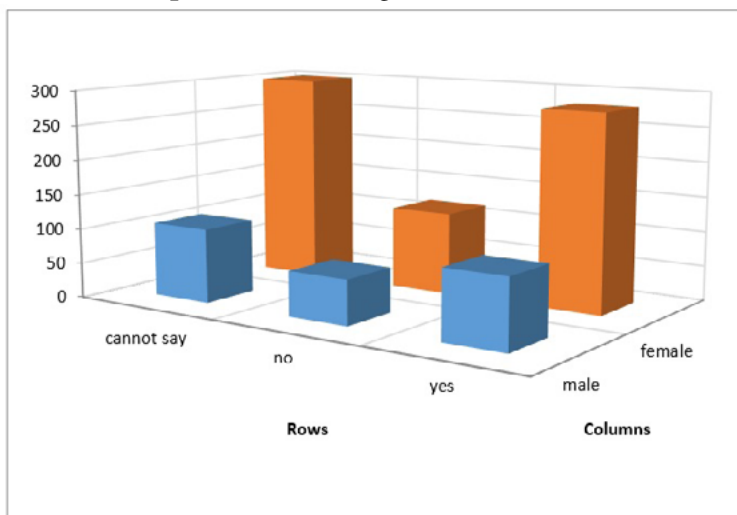
Source: Authors´ work.

Results in case of income categories meet the expectations. Highest influence of meat price on the customers´ behaviour was detected in case of people earning less than 500€ and in the category earning 501-701€.On the other side, price change least affects categories of respondents with the highest income. It means that customers with low income perceive prices changes more sensitively than customers with higher income. Price change of meat therefore influence their behaviour more than other income categories.

Figure 4 **Influence of the price on different income categories**
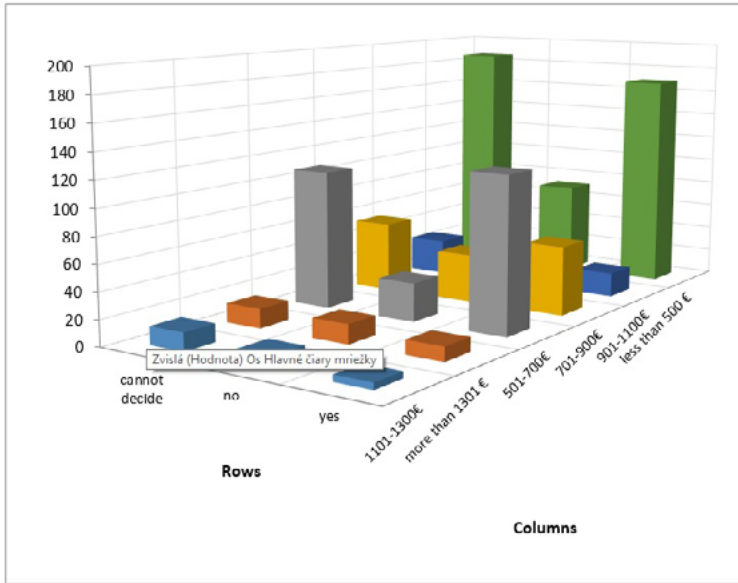
Source: Authors´ work.

Similar results were recorded also in case of economic activity influence, which also meet the expectations. Groups of customers influenced by price the most are especially employed and retired people. Retired people were the category which perceive changes in the meat price the most sensitively. On the other side, category least influenced by price changes were students.

Figure 5 **Influence of the price on different economic activity**
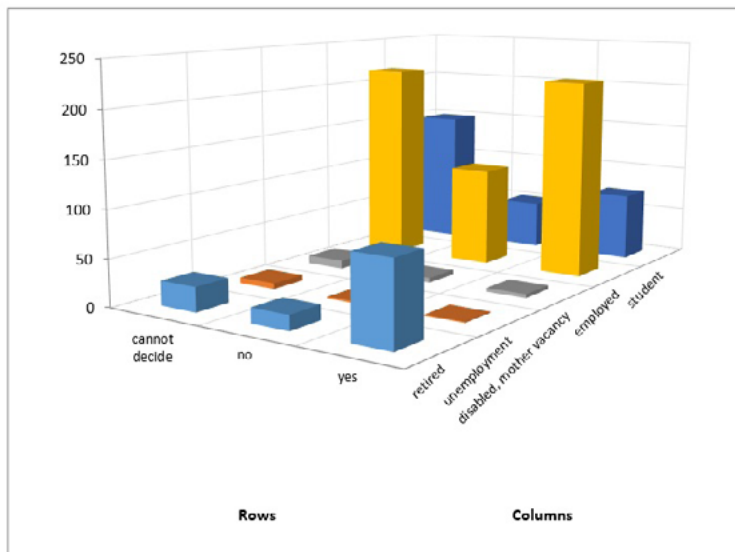
Source: Authors´ work.

Influence of age on respondents´ perception of price is shown on the figure 6. Older categories of customers perceive change in meat price the most sensitively. Highest influence of price was recorded in case of customers older than 46 years. It is interesting that price significantly influence also behaviour of customers in the age 19-25 years. Categories of people younger than 19 years and people in productive age (26-45 years) are not so sensitive to price change of the meat.

Figure 6 **Influence of price on different age categories**
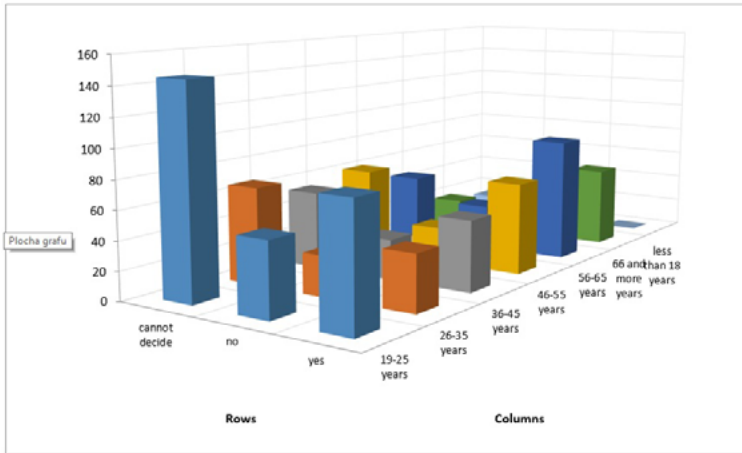
Source: Authors´ work.

4   Conclusion

Proposed paper was focused on the identification of influence of meat price on customers´ preferences. For this analysis were analysed data coming from the questionnaire survey. First, respondents were asked to rank different factors which influence their preference when buying meat products. Among four factors: quality, country of origin, price and brand was price ranked as the third. Factors which are more important for the respondents when buying meat are quality and country of origin, on the other side factor labelled by respondents as the least important was brand.

Next step in the analysis was the identification of the categories of respondents which are influenced by the price change the most. In this case were related respondents´ answer to question if they perceive price change of meat with following attributes: frequency of consumption, gender, age, income, economic activity and education. Result suggest that frequency of consumption and education of respondents is not related with their sensitivity to price changes. On the other side, gender, age, income and economic activity are significantly related to customers´ sensitivity on price changes. Strongest relationship was recorded in the case of age and economic activity. Based on the result of performed analysis it can be concluded, that categories influenced the most by the meat price change are females, with low income, which are employed or retired, in the age 19-25 or age

category over 46 years. Category of people least influenced by price when buying meat are males, with high income in the age 26-45 years.

Results of the performed analysis offered insight into behaviour of customers buying meat. Price is important factor influencing respondents´ behaviour and difference in their perception of the price change should be considered especially in the price policy and advertising campaign related to meat products.

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CONSUMER SHOPPING BEHAVIOR IN THE TOWN OF ŽILINA

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Abstract

Consumer shopping behavior is an important sociological phenomenon seen as a manifestation of consumerism lifestyle. Its character is largely influenced by the society in which consumer uses goods and services. The tendencies of consumer behavior are influenced by the availability of goods, sales culture, offer of sales concepts, real household income, lifestyle, and marketing activities of sellers. It affects not only the economy, but also it has significant social and cultural impacts. In specific cases, it also has an important spatial function in terms of catchment areas for the selected shopping centers. At present, buying decision-making behavior of the population is inclined towards a modern type. It is characterized by impulse purchases and consumer is influenced e.g. by advertising, offers of discounted products, numerous purchases in a single day, has high demands on quality of goods and shopping comfort, optimizes the ratio between price and value of goods, prefers large-scale retail stores and regularly uses car for shopping. Customer of the Žilina city behaves with experience, and demands the price corresponding to the product quality. Residents of Žilina have close to the so-called "western" modern shopping model, where shopping presents almost the same alternative for shopping as well as spending leisure time in the SC.

Keywords: *Consumer buying behavior, Motivation for shopping.*

JEL Classification: *D1, D12, R 19*

1   Introduction

Before making the purchase decision, consumer goes through the buying process during which offered alternatives are evaluated, compared, and decision for one or more of them is made. The influence consumer is subjected to during the decision-making process can affect his purchase decision with varying intensity and strength, and also with different results. Some impacts also act at a subconscious level (Rybanská, 2015). As Svetlík, Šugrová and Šedík (2017) describe, consumer purchase decisions are significantly influenced by many factors and the authors have ascertained in their research that consumer behavior is primarily affected by price, quality, image and strength of the brand.

In a market economy, goods and services are offered to consumers, who by buying them form the demand. (Kubicová, Kádeková, 2011). Purchase of goods and services involves everyone, it is reflecting the socio-economic conditions of people's lives, traditions, culture and overall living standards (Holienčinová, 2013). Shopping in retail stores is one of the major recurrent spatio-temporal human activities and is therefore a popular object of studies for several scientific disciplines including the geography (e.g. Miller, O'Kelly, 1983; Scott, He, 2012). For instance, Franz, Appel, and Hassler (2013) wrote about shortening of the shopping time. This phenomenon, according to their research, is related to women working outside the home, which reduces the time for cooking, thus leading to an increased demand for processed foods but also to the fast ways of shopping. Consumer behavior is changing in the face of changing market conditions. (Kádeková, Kubicová, 2012; Géci, Nagyová and Rybanská, 2017).

A changed technology scene and radically changed consumer behavior force retailers to reassess their business models, retail formats and retail offers (Hultman et al., 2017). Retailers which can acquire effective insights from market data, can better predict consumer behavior, design attractive offers, focus better on their customers and develop tools (Grewal, Roggeveen, Nordfält, 2017). Such large data can trigger beneficial cyclical processes of customer consumption and engagement, which in turn lead to increased profitability (Bradlow et al., 2017). Targeted information and offers directly tailored to customers was described by Trembošová and Tremboš (2009), during the stage of demassification of retail in Slovakia, but also others, e.g. Grewal, Roggeveen, Nordfält, (2017). Classification of consumer behavior is addressed by a large group of authors. We can categorize customer typologies according to lots of demographic or psychological aspects - transport modes, shopping frequency, type of purchased products, shopping location, buying behavior, context, etc. Segmenting of SC consumers in six largest cities in Turkey was described by Kabadayi and Pakson (2016). As a result of

the two-tier cluster analysis that was used to segment respondents, there are four distinct segments of visitors in Turkish shopping centers – serious, recreational, pragmatic consumers and enthusiasts. A study from SC in Kuala Lumpur, Malaysia (Alavi et al., 2015) identified four styles of consumer decision making - hedonistic, novelty/fashion conscious, utilitarian and impulsive. Consumer decision making is subsequently projected into strategies, especially marketing strategies (Kubicová, Kádeková, 2017).

Within the geography of retail, changes in consumer buying behavior in relation to spatial contexts with respect to the demographic processes were addressed by Spilková (2012), Kunc et al. (2012, 2013), Mitríková et al (2012, 2015), Trembošová (2009b, 2009c, 2010), Križan et al. (2015, 2017), Bilková et al (2015). Issues with consumer mobility changes with respect to services in the sphere of catchment areas were addressed by Frantál et al (2012), Maryáš et al. (2014). Spilková (2003) considered shopping centers to be driving force behind formation of modern consumer buying behavior in the transformation period and conducted retail behavioral surveys in Prague. Similarly, Mitríková (2008) published a treatise on buying behavior in Prešov a Košice.

The effect of how economic crisis changes the consumer behavior strategies was defined by Puelles et al. (2016) and Cristini and Laurini (2016). Their conclusions demonstrated that consumers attention have shifted significantly to discounted products but have also increased the use of the Internet in preparation for shopping. If consumers have changed their behavior and attitudes, it has a tremendous impact on society and business (Holota, Hrubec, Kotus, Holienčinová & Čapošová, 2016). The growing sales of discount retail chains have confirmed that the economic crisis has made a significant shift in consumer buying behavior in retail sector. The results of questionnaire surveys from the city of Nitra in 2008 and 2012 (Trembošová and Dubcová, 2013) confirmed that prior to the crisis, residents of Nitra behaved in a modern way, could be influenced about their shopping, they were demanding and mobile, but after the crisis in 2012 they leaned towards the traditional shopping, they were thrifty, loyal and cautious.

The aim of our paper is to evaluate the survey focused on buying behavior of Žilina population in spatial context matters. Results in category "personal consumer" should confirm or rebut the premise of a modern behavior of consumers in Žilina.

2   Data and Methods

The object of our study was the city of Žilina. Primary tool for data acquisition was a questionnaire research conducted in June, September and October 2015.

During 21 days answers were recorded from 403 random residents over 18 years of age residing in Žilina (Mašlonková, 2016). The questions included were both closed-ended and open-ended, focused on the views of respondents on given topics. The results were processed in two hierarchical levels of the spatial scale: at the city level, and 20 boroughs. In the group of respondents, women represented 53.3% and males 46.7%. The most represented age group was 40-49 years old (23.3%) and 60+ years old 22.8%, followed by 30-39 years old (18.1%), 50-59 years old (17.4%), and 20-29 years old (13.7%). Most women belonged to a group of 40-49 years old (57 females), most males were at age group 20-29 (37 men). Least represented age category was under 20 years formed by 7 men and 12 women. According to education category, prevailed respondents with completed secondary education 74.9%, followed by a higher education 23%, and elementary education 2.1%. In terms of the economic activity, most respondents were employed for wages 42.4%, followed by 22% retirees and self-employed (11.9%), students 10.4%, and 6% of participants out of work. 28 female respondents (6.9%) were on maternity leave. In category of household net monthly income, maximum 32.9% reported range 501-1000 €, and 30.9% income within 1001-1500 €. Household income of 1501-2000 € was claimed by 17.1% of respondents, 16.3% declared income up to 500 €, 1.3% of respondents acceded to a 2001-2500 € segment and 6 respondents (1.5%) reported household incomes above 2501 €.

The questionnaire consisted of two parts. The first part of this paper was dedicated to a choice of a shopping place and the second part dealt with buying behavior. Respondents' replies were used for: (i) identifying the places for purchase of food and consumer goods, based on predominantly consistent responses, (ii) an analysis of priority factor affecting the choice of retail store by respondent, (iii) the purchasing power factor. The second part of the contribution is based on the recognition that consumer behavior, because of different reactions, splits customers into certain groups. Presented analysis of sociological-purchase-decision-making types of addressed respondents defines the size and spatial context of their occurrence at the level of boroughs.

For tracking and consecutive demarcation of city's catchment areas through retail facilities, were used responses to these questions: (i) Specify a store within the area of Nitra where you most often buy food, clothing, footwear, drugstore goods and consumer goods? (ii) Which of Nitra's shopping centers do you prefer and what are the reasons for your choice? (assortment (stores), accessibility, habits, environment, lower prices, parking, leisure time activities? Based on the prevailing consistent replies to the choice of shopping place, centers for shopping activities were identified, and their catchment areas deduced (Trembošová, 2009a and Trembošová et al., 2016).

In order to determine the purchase decision-making orientation, the method of self-determining the purchasing characteristic was used in the question: (i) *Circle the attribute that most closely describes your buying behavior* (the respondent had written information about the attributes of each purchase decision-making type): *A) influenceable* - emotive behavior in buying, influenced by advertising, buys discounted products; *B) demanding* - has high demands on the quality of goods and shopping comfort; *C) mobile* - optimizes the price over value ratio, prefers large-scale stores, regularly uses a car; *D) cautious conservative* - decides rationally and conservatively, does not trust advertising, shops without car; *E) price conscious* - minimizes expenses, purchases rationally, rarely uses a car; *F) loyal customer* - purchases often and in small quantities, prefers a smaller shop near the home, believes in tradition, conforms shopping to social aspects of life; *G) undemanding phlegmatic* – without any claims on the store standards, does not care about prices, he does not travel for shopping. The first three types form a group of modern buying orientation, the remaining four compose traditional buying orientation. The questionnaire method of self-determining the purchase decision-making type was also used by Jantarat and Sharon (2016).

Differential analysis of the age of respondents was performed to verify whether there was a correlation between the three qualitative traits of respondents: age, household income, and purchase decision-making type. Dependencies were calculated using the test for contingency table creation (Markechová et al., 2011). The intensity of statistical dependence was calculated using Pearson's Coefficient of Contingency, which allowed us to determine the degree of dependence between selected observed attributes. Hypotheses were tested at $\alpha = 0.05$, using the DATA analysis application.

3 Results and Discussion

The highest form of retail network had only begun to develop in Žilina after 2009, when a significant boom in the construction of third-generation shopping centers (SCs) operated by foreign retail chains occurred. In 2015, already 57 large-scale retail stores (over 400 m²) operated in Žilina, from those 4 shopping centers: SC Aupark, SC Mirage, SC Dubeň and Max Entertainment and shopping centre. At these SCs in 2015, together 234 sales units operated their stores on net retail area 23,319 m², accounting for 19.33% of the total city retail area (120,623 m²). Gross leasable area reported on the websites of these centers was 46,600 m².

Three of the common factors influencing buying process were evaluated: 1) days of the week preferred for shopping, 2) general factors affecting the choice of shopping place, and 3) transport modes for shopping purposes. Together 121

respondents (30%) indicated that they are shopping on regular basis. Shopping during working days was preferred by 50% of the respondents, most of them favored Tuesday (82%) and Friday (74%). Weekend shopping explicitly was preferred by 19.6% of respondents.

Body of 403 surveyed respondents was dominated by women with 53.3% and men were represented by 46.7%. In terms of age-class distribution, the most represented age group was 40-49 years old (22.8%) and 60+ years old (22%), followed by 30-39 years old (18%) and 50-59 years old (17%). Most of the women belonged to 40-49 age group (57 women), and most of men to age group 20-29 (40 men). The least represented group was the age category under 20 years old (6 men and 8 women).

Divided by education, respondents with completed secondary education (74.9%) prevailed, followed by higher education group (22.8%), and elementary education group (2.3%). According to the category of economic activity, majority of respondents were employed for wages (42.4%), followed by retirees (22%), self-employed (12%), students (10%), women on maternity leave (7%), and the rest declared out of work status (5.9%). In category of household net monthly income, majority of respondents reported income of 801-1200 € (32.5%) and income of 401-800 € (28.1%). Household income of 1201-1600 € was claimed by 16.8% of respondents, 15.9% declared income up to 400 €, 5.6% of respondents stated income of 1601-2000 € and 4 respondents (1.1%) reported household income above 2001 €. Profile of a typical customer based on a group of 403 respondents according to individual categories was a woman (53.3%), 40-49 years old (22.8%), with secondary education (74.9%), and employed (42.4%).

Among the factors most affecting the choice of place for shopping in the city of Žilina, price of goods was the pivotal factor, affecting up to 68.7%. of respondents. The quality of the goods was decisive for 28%, the width of the product variety for 6%, the overall atmosphere and the store layout for 2.9%, while the opening hours for only 1.2%. The answers also revealed that 50% of respondents do their shopping on working days and usually choose a store in their neighborhood, hence they do not travel in mass into large-scale retail store centers. As much as 30% of respondents stated that they shop regularly every day and 18% of individuals went shopping on weekend. According to the mode of transport, a car is prevalent as it is used for shopping trips by 49% of respondents, 22.7% used public transport, 22% selected walking, and only 6.7% of the respondents claimed the use of bicycle for shopping purposes.

3.1   Choosing a shopping location

In conformity with consistent respondents' replies, the centers for shopping food-stuffs, drugstore goods, clothing and footwear, and other consumer goods were allocated within the city territory (Figure 1). Question about choosing shopping location focused on identifying shoppers' preference for stores for purchasing foodstuffs, drugstore goods, consumer goods, clothing and footwear, according to prevailing replies. The favorite stores for food shopping as selected by respondents were Tesco, Coop Jednota, Billa and Kaufland. Stores in Tesco chain were preferred by respondents in 12 boroughs, namely Bánová, Budatín, Hájik, Hliny, Mojšová Lúčka, Považský Chlmec, Rosinky, Staré Mesto, Strážov, Zádubnie and Žilinská Lehota, where 38,330 residents of Žilina (46%) lived. Results from another 4 boroughs indicated preference for Kaufland (Bôrik, Trnová, Vlčince, Zástranie), which represented 25,470 inhabitants (31%). In Brodno, Bytčica and Solinky boroughs, with 16,593 (20%) of Žilina dwellers, respondents preferred Coop Jednota chain stores, and 2466 inhabitants (3%) of Závodie borough favored Billa store (Figure 1A).

The selection of drugstores is more spatially variable (Figure 1B). The most frequent responses listed Tesco, Kaufland, 101 Drogerie, Drogerie Markt, and Teta drogéria stores. In 10 boroughs, Bánová, Bôrik, Hájik, Hliny, Mojšová Lúčka, Rosinky, Strážov, Trnová, Vranie, Zádubnie and Zástranie, respondents preferred the drugstore goods purchased in Tesco store, which is a gravitational center for 31,776 inhabitants (38%). In Bytčica, Solinky, Závodie and Žilinská Lehota boroughs, respondents preferred the 101 Drogerie store (18,067 inhabitants, i.e. 22%). Respondents from Staré Mesto and Považský Chlmec boroughs (12,218 inhabitants, i.e. 15%) favored the Drogerie Markt store. In Brodno and Vlčince (19,777 inhabitants, i.e. 24%), preferred store was from Kaufland chain, and in Budatín with 1753 inhabitants it was Teta drugstore.

Figure 1 **Food and drugstore goods shopping location preferences**
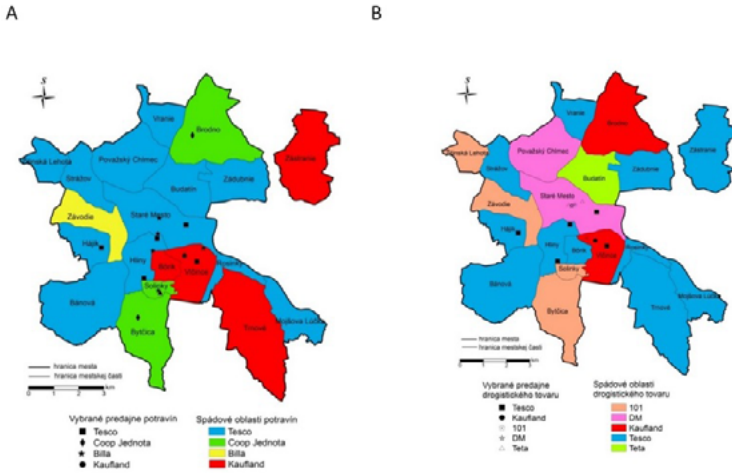
Source: Own research.

Within consumer goods category, preferred stores were Nay Elektrodom, Datart and Tesco. Respondents of Budatín, Zádubnie a Zástranie boroughs (4%) preferred to purchase consumer goods over the Internet. Participants in Bánová and Brodno boroughs, together with 3173 inhabitants (4%) preferred Tesco, and 3.6% of Strážov and Závodie boroughs most often listed Datart store. Respondents of the remaining 13 boroughs preferred Nay Elektrodom store, which has the most significant catchment area with 73,974 residents, i.e. 89% (Figure 2A).

With responses to the question about purchasing clothing and footwear, respondents were not specific about the store name, mostly they chose shopping centers. The most preferred shopping center was Aupark. It was given priority by the respondents at 13 boroughs and it was the gravitational center for clothing and footwear purchases for 43,485 inhabitants of Žilina (52%). SC Mirage was favored by respondents from of 5 boroughs, Bôrik, Mojšová Lúčka, Považský Chlmec, Rosinky, Staré Mesto a Trnová with 19,612 inhabitants, representing 24% (Figure 2B). Respondents from Vlčince with 18,472 inhabitants (22%) gave priority to Atrium Dubeň and respondents from Bytčica (2,022 inhabitants, 2.5%) preferred shopping for clothing and footwear at Max ESC.

The most popular shopping center, according to the survey participants, was SC Aupark, which was preferred by 47% of the interviewed. The second most visited was SC Mirage with 27% popularity and 7% of respondents preferred Max ESC. The least popular shopping center was Atrium Dubeň, which only favored 3% of respondents. As much as 16% participants expressed that they did not visit

shopping centers. The most important factors influencing the respondent when choosing the shopping center were the opening hours (38%), location (47%), price of the products (12%), atmosphere in outlets (3.8%), and advertisements (0.20%). The reasons listed are purchase of food (48%), consumer goods (85%), drugstore goods (54%) and leisure time activities (9%).

Figure 2 **Consumer goods, clothing and footwear shopping location preferences**
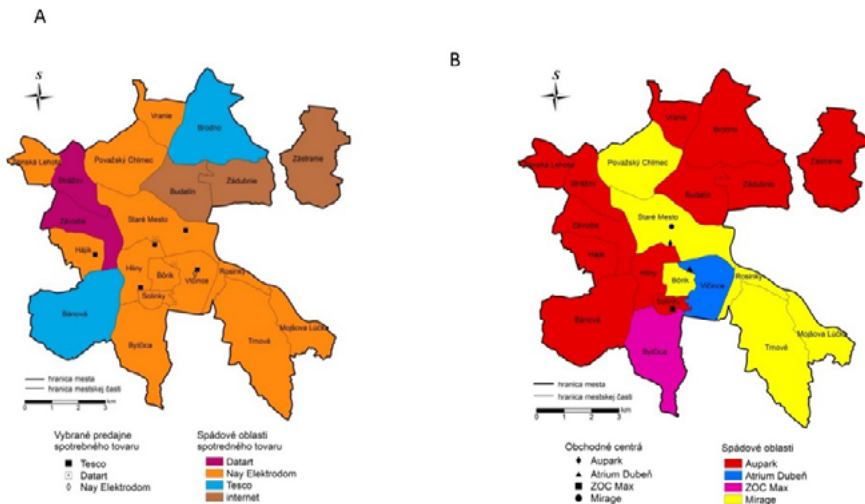
Source: Own research.

The results of survey in Žilina in 2015 revealed that at the level of city, the largest group of respondents (21.1%) belonged to a price conscious purchase decision-making type (Figure 3). It was followed by a demanding type which characteristics were most apt for 20.5% of respondents, while 16% classified themselves as a mobile type. Influenceable buyer type was claimed by 13.4% of participants, and undemanding phlegmatic type was circled by 10.9% of respondents. Next 9.9% of participants were of a loyal type, and only 8% of respondents classed themselves in the last group of a cautious conservatives. The ratio between the modern (influenceable, demanding and mobile type) and the traditional (cautious, price conscious, loyal and undemanding type) type is almost balanced, the modern one is leading with only 0.12% of a point.

Figure 3 **Purchase decision-making types of respondents in Žilina in 2015**
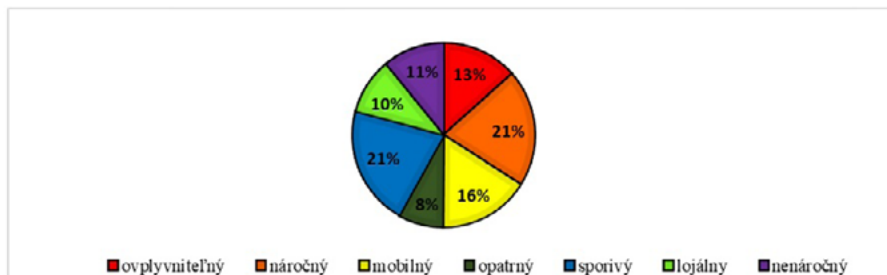
Comment: Purchase decision-making type: A – influenceable, B – demanding, C – mobile (pragmatist), D – cautious (conservative), E – price conscious, F – loyal, G – undemanding (phlegmatic)
Source: Field research by authors, 2015.

In Bánová, Brodno, Bytčica, Hájik, Hliny, Považský Chlmec, Rosinky, Staré Mesto, Strážov a Zástranie boroughs, the traditional purchase decision-making type was prevalent. In Bôrik, Budatín, Mojšová Lúčka, Solinky, Trnová, Vlčince, Vranie a Zádubnie boroughs it was the modern type. There is a balanced ratio 50:50 between the modern and traditional types in Závodie borough.

In the next part, Chi-squared test for contingency table creation served to verify whether there was a statistically significant dependence between the selected observed characteristics - age and purchase decision-making type of respondents (Table 1).

Table 1 **Indicators of dependence testing between age, net monthly household income and purchase decision-making type of respondents**

Age category	Sample size (number of respondents)		χ^2 - testing criteria	Contingency coefficient C
	Abs.	**%**		
under 20 years	19	4.71	56.5974	0.854
20-29	55	13.6	25.0008	0.536
30-39	73	18.1	49.2893	0.672
40-49	94	23.32	96.8921	0.691
50-59	70	17.36	98.098	0.639
60+	92	22.83	177.006	0.701
Žilina	403	100	-	-

Calculation: Trembošová, 2017

The value of Chi-square criteria ranged from 25.0008 to 177.006 and the contingency coefficient from a low 0.536 to a high dependence 0.854. We found out that the age, income, and purchase decision-making type were statistically most dependent in the age category of under 20-year-olds and over 60-year-olds. With the rest of age groups, degree of dependence was ranging from lower to medium level. Based on this, we can predict the purchase decision-making type of a resident of Žilina from a particular age group with a corresponding net monthly household income (Figure 4).

Figure 4 **Differentiation of respondent purchase decision-making types by age and net household income**
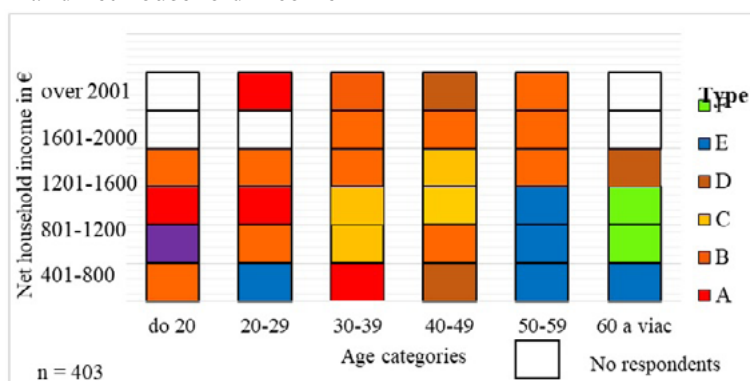
Comment: Purchase decision-making type: A – influenceable, B – demanding, C – mobile (pragmatist), D – cautious (conservative), E – price conscious, F – loyal, G – undemanding (phlegmatic)
Source: Own research.

According to the prevailing answers, a mosaic of 42 groups (Figure 8) was created, where all 7 categorized types (A to G) were exhibited. As many as 12 groups of them have identified themselves (the vast majority of the answers) with a demanding (B) type of modern orientation. Followed by a price conscious type E (5 groups) and cautious type D (3 groups) both of a traditional purchase decision-making orientation.

In under 20 years old age group (4.71%), 10 participants reported their most common household income category 801-1200 €, 5 respondents selected 401-800 € range, 3 participants claimed income less than 400 € and 1 respondent reported 1201-1600 € tier. 68.5% of the respondents inclined to a modern purchase decision-making orientation and their top choice was an influenceable type (6 respondents) and demanding (7 respondents) type. Next 4 participants identified

themselves with an undemanding type. Age group of 20-29 years old respondents was the fourth largest group (13.6%). From those, 30.9% reported household income of 401-800 €, followed by income category less than 400 € and 801-1200 € category. The most numerous purchase decision-making group was the modern influenceable leading with 32.7% of participants and 27.3% of respondents formed a group of demanding type. Of the 73 participants (18.1%) in the 30-39 years old age group, the most (43.83%) reported household income in the range of 801-1200 €, and 38.4% lower income group 401-800 €. This age group contained the highest number of mobile type participants (30.1%), demanding type with 28.8% and influenceable type with 21.9%. They represented a typical modern age group in their buying behavior. In the largest age group of 40-49 years old respondents (23.32%), the most preferred purchase decision-making characteristic was a modern mobile type (37.2%), followed by a demanding type (29.8%). Prevalent net household income was in range 801-1200 € (58.55%) and 1201-1600 € (36.2%). Middle-aged respondents in 50-59 years old age group represented 17.36%. The most numerous income groups of 401-800 € and 801-1200 € accounted for almost identical 45%. In purchase decision-making category, 77.1% of participants aged between 50-59 years represented traditional price conscious type, 18.5% were mobile and 9% the loyal ones. The second largest age group of over 60 years old respondents accounted for 22.8%. Up to 53% of them reported household income in range 401-800 € and 44.5% reported income up to 400 €. The most frequent response group of 60+ years old (as expected) was formed by traditional loyal customers with 73.9% and 13% reported to tie in with price conscious type.

4 Conclusion

Generally, changes in buying behavior are triggered by 3 attributes: need, supply, and resources, which are strongly influenced by socio-economic status of households. As part of the buying decision-making process, consumer goes through the buying process during which available alternatives are evaluated and compared, and then one or some of them are decided upon. The influence consumer is subjected to during the decision-making process can affect his buying decision-making process with varying intensity and strength, and also with different results.

Profile of the respondent from survey group of 403 participants based on individual categories was a woman (53.3% of participants), 40-49 years old (22.8%), with secondary education (74.9%), and employed (42.4%).

Respondents were loyal to discounts and benefits, not to brands, decisive factor was the price of the products, while the least emphasis was put on the opening

hours. The answers also showed that 50% of respondents preferred shopping during working days and usually visited stores in their immediate neighborhood, hence they no longer travelled in mass to the large-scale retail centers. As much as 30% of respondents reported that they go shopping on daily basis and 18% of individuals favored shopping during the weekend. Based on the mode of transport preferred when shopping, a car was used by 49% of participants, 22.7% used public transport, 22% preferred walking, and last 6.7% used bicycle.

In the spatial context at the level of Žilina boroughs, the catchment areas of Tesco, Coop Jednota, Billa and Kaufland chain stores were identified. Heavy traffic congestion of vehicles and pedestrians with shopping intentions was particularly in the zone of Staré Mesto borough which forms the core of the retail network supplemented by two shopping centers.

In their purchase decision-making tendencies, in almost every Žilina borough, a certain number of respondents identified themselves with the attributes of a price conscious traditional orientation, and it was therefore the most widespread purchase decision-making type. Other types were not always represented in all boroughs. Spatially lowest variability was expressed by those respondents which identified themselves with "cautious conservative" and "loyal" purchase decision-making type, which were only selected by participants from 10 boroughs. Although most respondents (21%, i.e. 85 participants) reported as price conscious traditional purchase decision-making type, the higher preferences were reached by the modern category (influenceable, demanding and mobile) together 50.12%.

Based on the results of buying behavior research in the city of Žilina, objective assessment of such factors as the use of cars (confirmed by 49% of respondents), preference of shopping centers (for purchases of consumer goods, clothing and footwear even up to 79%) was identical to subjective self-assessment of respondents. The assumption set out in our paper has been confirmed, the residents of Žilina can be considered modern in their buying behavior, despite the lower consciously admitted net monthly income of respondents' households (32.5% respondents reported income in the range 801-1200 €). According to the results, residents of Žilina in the age groups under 20 years old and 20-29 years old are demanding when shopping, residents in 30-39 years old group prefer shopping with car and are mostly demanding and mobile pragmatist shoppers. Population in 40-49 years old group belongs to the mobile pragmatist category as well. Traditional purchase decision-making tendencies were expressed by respondents with age over 50 years (50-59 and 60+ groups) who are price conscious. Respondents in 60+ years old group are also loyal.

We learned from the responses that average customer in Žilina behaves with experience and demands the price to match the quality of the product. Residents

of Žilina have close to the so-called "western" modern shopping model, where to go shopping presents almost the same alternative for shopping as well as spending leisure time in the SC. The ratio between the modern (influenceable, demanding and mobile type) and the traditional (cautious, price conscious, loyal and undemanding type) type is almost balanced, the modern one is leading with only 0.12% of a point. In this process, the objective variable purchase motivators (price, location, availability) outweigh the subjective variables (store atmosphere, advertising). Growing demands and sophistication of the buyers lead to a differentiation in customer buying behavior, and as a result, the average customer is quickly disappearing.

Acknowledgements

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OPTIONS FOR IMPLEMENTING LEAN MANAGEMENT ELEMENTS (CASE STUDY OF A RESTAURANT AT THE WARSAW CHOPIN AIRPORT)

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Abstract

The study presents the outcome of application of selected Lean Management tools in a fast-food bar located at the Warsaw Chopin Airport. Relying on observations made in other bars managed by the company since 2010, we prepared reliable proposals of how to improve selected elements of production and organisation of work. The following tools were used in the study: (1) Value Stream Mapping (VSM), (2) Kaizen, (3) 5S.

Application of Lean Management tools shortened the production process, enhanced work and reduced energy consumption. Simple organisational changes and changes in the attitudes of employees maximised profits and saved time and money.

It must be remembered that the tools presented in the study were tailored to the case discussed. With the ability to consult all possibilities related to the distribution of working tools and side dishes with the employees, we managed to choose the most optimum and ergonomic solutions.

Keywords: *lean management, lean manufacturing, management concepts*

JEL Classification: *M11, M51, L83*

1   Introduction

In recent years many companies have introduced fundamental changes into their production processes. One of the most influential of such changes has been the implementation of Lean Management (Krafcik, 1988; Tillema & van der Steen, 2015; Cortes et al., 2016). Lean Management is an operating concept of managing a manufacturing company (Walentynowicz, 2013; Grycuk, 2016), listed among the most effective strategies used in companies worldwide (Hadaś et al., 2012). As stated by Womack et al. (2007) *lean production is 'lean' because it uses less of everything compared with mass production-half the human effort in factory, half the manufacturing space, half the investment tools, half the engineering hours to develop a new product in half time. Also, it requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever-growing variety of products.*

However, Lean Management cannot be applied only in relation to the company's manufacturing processes. The attitude must be a comprehensive one, meaning that it needs to apply to the entire enterprise (Kwiatkowski et al., 2016; Hashmi et al., 2015).

Within the last 30 years, the method has significantly changed production, services, commerce and the public sector (Bahsin, 2015; Pedersen & Hunishe, 2011; Kowalewski, 2015; Gupta et al., 2016). Initially, it was implemented only in big companies, but has for some time been gaining popularity in small companies as well (Nowosielski, 2015; Martínez-Jurado & Moyano-Fuentes, 2014; Mrugalska & Wyrwicka, 2017). Although literature mentions the benefits of individual Lean Management tools, a properly composed and configured combination of tools proves to be even more effective in the process of improvement of manufacturing processes (Antosz, 2013; Boskrobko, 2007). In the simplest of interpretations, this method consists in the slimming of management processes, elimination of redundant actions, reduction of production times and minimisation of consumption of raw materials and energy. The Lean system is based on three main pillars: (1) strategic planning, (2) business structure, (3) HR capacities, the foundations of which are continual improvement, enhanced performance and cost reduction (Okręglicka, 2015).

2   Data and Methods

The study presents outcome of the application of Lean Management tools in a fast-food bar located located at the Warsaw Chopin Airport. The place was chosen because of its large potential (spatial, demographic and market) - each

year an airport takes a growing number of passengers, and a restaurant constantly increases its turnover. Relying on observations made since 2010 in other bars managed by the company, we prepared reliable proposals of how to improve selected elements (Antczak & Puchała, 2014; Pakdil & Leonard, 2014), i.e. how to enhance performance whilst reducing the times of production cycles and energy consumption (Hadaś et al., 2012; Okręglicka, 2015). The applicability of the Lean concept depends, among others, on: (1) nature of the business activity conducted, (2) concept implementation phase, (3) professionalism, which reflects the expertise of implementers (Tillema & van der Steen, 2015).

The Lean Management method was selected upon a thorough analysis of the working system in the facility. The following tools were used in the study: (1) *Value Stream Mapping (VSM)*, a method that seeks to recognise all actions that are undertaken during the cycle of production or service provision, (2) *Kaizen,* a method based on involvement of the entire staff employed by the enterprise in the working and production processes, and, finally (3) 5S, used in order to eliminate redundant elements that lead to waste of materials in the source stream (Bączkowicz & Gwiazda, 2014; Wolniak, 2014). The paper demonstrate the VSM method on the example of two products: pieces of chicken and sandwiches that requires passing through all the positions of the production line. The focus was on ergonomics and the availability of semi-finished products and packaging. These facts has helped the possibility to carry out the changes without interference with the already existing solutions. In tested restaurant the *Kaizen* method has been integrated with *5S*. The awareness of employees was raised, common conversations were introduced (searching for the source of problems and implementation of achieved solutions), and also the self-discipline of the staff. Workers were provided by information about their progress and improvements. Received changes allowed to maintain the popularized principles and developing them.

The solutions presented were verified in practice. Because of the specification of the place (a small amount of menu items, low prices and very fast customer service), they should be treated individually. The techniques selected may produce different effects in another bar owned by the Polish fast-food market leader. Due to the standards in place at the organisation, some of the solutions were only verified, without being permanently implemented (for one week).

3   Results

The first of the solutions proposed encompassed: (1) reduced use of the other side of kitchen and slots, (2) reduction of working hours of table heaters, cake heaters and meat heaters, (3) switching off two coolers after closure of the restaurant (4)

switching off one of the coffee machines during night hours, (5) turning off cashes after closure of the facility, (6) switching off the redundant lighting (menuboards, logos and all screens). After the implementation of equipment operation schedule, energy consumption decreased from 5488 kWh to 5307 kWh (Figure 1).

Figure 1 **Energy consumption before and after implementation of equipment operation schedule (data presented for one week in August 2015 and May 2016).**
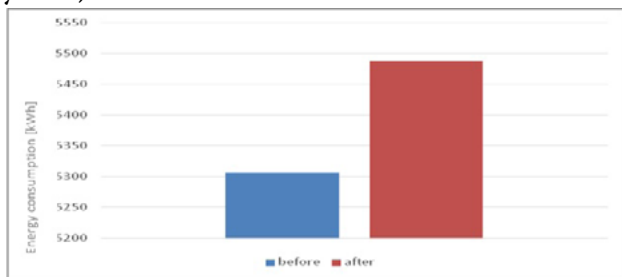
Source: Author's own work.

Average energy consumption in comparison with the number of daily transactions (TC) in the week analysed was lower by 3.88% than in comparable days of the previous year (Table 1, Figure 1). The benefits may not seem high, but produce notable savings of money and energy for the year as a whole (above 5200 PLN/year). The result is attainable with the introduction of a schedule of operation of equipment, without additional costs related to replacement of devices.

Table 1 **Daily energy consumption with the new schedule**

Day	TC	Energy consumption [kWh]	Date of comparison	TC	Consumption [kWh]	Proportional consumption [kWh]
08/05/2016	14599	693.06	16/08/2015	14288	714.04	729.54
09/05/2016	1445	693.64	16/08/2015	1428	714.04	722.54
10/05/2016	1119	619.20	19/06/2015	1119	658.72	658.72
11/05/2016	1193	656.95	15/09/2015	1192	669.8	670.36
12/05/2016	1145	634.20	09/09/2015	1146	668.16	667.58
13/05/2016	1339	675.49	20/07/2015	1332	699.96	703.64
14/05/2016	1023	628.99	03/09/2015	1024	649.08	648.45
15/05/2016	1439	705.15	16/08/2015	1428	714.04	719.54

Source: Author's calculations.

Elaboration of a new VSM significantly shortened duration of the production process (15 employees has been tested, regardless of seniority). Simple organisational changes and changes in the attitudes of employees (better human relationships, interviews with employees, different style of restaurant management, further training of employees, the circulation of information) brought in better performance and acceleration of work (Figure 2). Operating hours were shortened in virtually every work station.

Figure 2 **Histogram of operating hours in selected work stations [blue line: time before VSM implementation, red line: time after VSM implementation]**
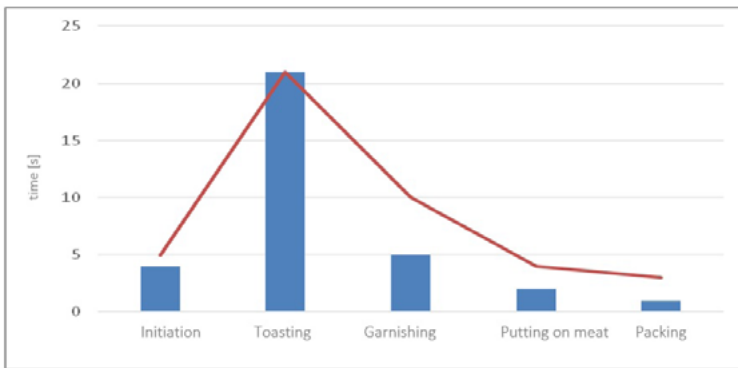
Source: Author's calculations.

The only work station where the operating hours were not reduced was the toasting station, which was because of the quality requirements in place at the organisation. The average duration of the production cycle was shortened by 10 seconds (from 43 to 33). The performance of the work stations grew by 20, 50, 56 and 67%, respectively. The histogram (Figure 2) above does not include the times of migration between individual stations. Calculations showed, however, that they decreased from 44 to 30 s. To better show the performance improvement, a Material Stream Map was created (Figure 3). The map illustrates the handling of an order of "sandwich + coffee". Before the implementation of the VSM time of sandwiches making was 58 seconds and the time of coffee production lasted 37 seconds. After the introduction of VSM system, restaurant staff resigned from sticking stickers on drinks. This betterment fixed one of the bottlenecks of production. Transition times of material between the positions has decreased. This was possible by organizing workplaces and change the position of some of the tools and packaging. The time of production an order

Figure 3 **New VSM after introduction of LEAN tools**
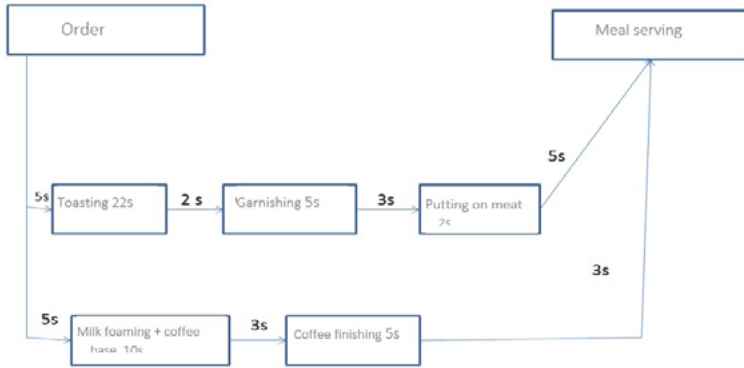
Source: Author's own work.

Lean Management was also used to enhance the semi-finished product tagging system. Before the tool was introduced, the specification of all tags took, on average, 58s. Production of groups of tags describing similar semi-finished products was proposed. With the leaning process, the number of tags produced was reduced and the average time dropped to 10.5 s, with concurrent performance enhancement by 82.5%. The so saved time can be devoted by employees to the proper production process.

After numerous discussions, employees, acting according to the principle *a place for everything and everything in its place*, proposed changes concerning order and designation of a place to keep the most commonly used objects: tongs for different kinds of meat. Additionally, a new distribution system was introduced for such objects (according to the rule that the most frequently used devices should be located at hand). Yet another enhancement was the adaptation of the work surface under the table into a storage place for unused drawers/containers. Finally, the coffee preparation area was improved, too, through the change of layout of containers with sides and tools. For the following reasons, coffee tagging was abandoned: (1) reluctance of employees to use the company's system, resulting from bartenders' knowledge about coffee, (2) lack of identifiable usefulness of the tags to customers.

As was noted during the study, the organisation's production system had a number of characteristics typical of Lean Management. The foods/beverages are freshly produced, which minimises losses and food wastage. A pull production system is used in the kitchen, meaning that the products are pulled forward and do not retract to other stations. Speaking the language of the Kaizen philosophy, it can be said that everything gets better. The example of the restaurant reflects the sense of this

philosophy. The system seemed good already before the study, but the study showed that it can be even better.

4   Conclusion

The changes introduced aim at improving the quality of the products offered. The study brought about notable and tangible benefits for the restaurant, meaning that the selected management method does work and has improved the organisation. A number of the solutions proposed have been implemented permanently. Some are still being consulted with top management. The following conclusions have been drawn from the survey:

1. better results can be obtained without financial expenditures. In the case analysed, diligence of employees played a most important role. If all employees know and abide by the principles of operation of the production system, food wastage is significantly reduced.
2. Additionally, the sequencing of operation of individual devices proved effective in reducing the costs of power consumption. It must be noted that all tools presented in this study were tailored to the case examined (meaning a specific restaurant).
3. The study shows that a number of Lean Management Tools are possible to introduce in the bar subjected to study. With these, the entire operation cycle can be accelerated by as much as 23%. Value Stream Mapping (VSM) made it possible to eliminate certain actions that used to significantly extend the duration of the production process. In some cases, Lean tools made it possible to "slim" the operating hours by nearly 70%.

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SESSION 2.2
FOOD MARKETING AND CONSUMER STUDIES- SESSION ORGANIZED WITHIN THE PROJECT APVV-16-0244 "QUALITATIVE FACTORS AFFECTING THE PRODUCTION AND CONSUMPTION OF MILK AND CHEESE"

NEW RESEARCH POSSIBILITIES FOR FEEDBACK ON THE DAIRY PRODUCT´ MARKET

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Abstract

The increasing of milk and consumption is one of the world´s leading problem in food and nutrition policy, whose eating has an irreplaceable health benefit. For this reason, feedback of customer preferences is needed for obtaining the data, if the consumption of milk and dairy products increase/decrease. Several surveys show that a customer, when he/ she enters to a shop does not have a clear idea, what to buy. To influence the consumer´s shopping process directly in the store on the basis of various impacts and impulses is the role of merchandising and in-store communication. A key aspect is the effectiveness and efficiency of these communication tools, which can be achieved not only by conscious but also by ignorant feedback from both current and potential consumers. The paper theoretically presents the new research possibilities and survey´ technologies and underlines the growing need for their implementation in the form of innovative research solutions, which are required in verification of effectiveness of all spectrum of communication tools on the dairy products 'market. These devices make it possible to examine the satisfaction (emotions, visual attention) as well as environmental factors, not only with the consciousness of the respondent (research vest, modified shopping trolley) but also without its full consciousness (interactive automated self-service kiosks, reaction time´ questionnaires). The interpretation of obtained data provides new opportunities for firms, which make business and sale of dairy products and offers new opportunities in design proposal and implementation of communication strategies.

Keywords: *consumer's decisions making, dairy products, emotions, innovative research tools, technologies*

JEL Classification: *M31, M39, M81*

1   Introduction

Nowadays, a food market is influenced by the new trends connected with healthy lifestyle, animal welfare, ethical consumption etc. In addition, the level of income has a certain influence on consumption patterns, the dairy segment is not an exception (Šedík, Šugrová, Horská & Nagyová, 2017). Milk is produced in every EU member state without exception, for the EU is a milk the most important product in terms of approximately 15 % of agricultural production. The European Union is a major player on the world market for milk and dairy products as an exporter of many dairy products, most of which are cheeses.

1.1   An Overview About Dairy Products´ Production and Consumption in Europe

The total EU-28, the milk production is estimated in around 159 million tons per year in 2016. The main EU producers are Germany, France, Great Britain, Poland, the Netherlands and Italy, accounting for almost 70 % of EU production (Poľnohospodárstvo a rozvoj vidieka, 2016). A quarter of 24.3 % of the estimated 30.4 million tons of drinking milk is produced in the EU-28 countries in 2016 comes from the UK, which represents only about one-tenth of the EU-28 milk produced for the state. This was also noticed in other dairy products, such as Germany, Italy and the Netherlands, where they accounted for nearly three quarters of 70.3 % of 5.5 million tons of cheese produced throughout the EU-28 in 2016 (Kubicová et al., 2017). Whole milk is used in the EU-28 (Table 1) mainly for production of cheeses (36 %), butter (29 %), cream for direct consumption (13 %), drinking milk (11 %) and others (Eurostat, 2016).

Table 1 **Dairy Products Made from Milk in 1 000 Tones, 2014, Country Ranking**

	Drinking milk	Cream for direct consumption	Dry milk	Butter	Cheese
Belgium	718	219	200	30	-
Bulgaria	67	2	-	1	2
Czech Republic	624	54	39	22	13
Denmark	504	61	129	43	6
Germany	-	567	580	441	1 893

	Drinking milk	Cream for direct consumption	Dry milk	Butter	Cheese
Estonia	91	27	6	4	41
Ireland	494	24	-	166	188
Greece	449	17	-	1	190
Spain	3 521	142	30	-	48
France	3 535	417	428	365	135
Croatia	294	27	-	4	33
Italy	25 478	131	-	100	1 176
Cyprus	67	3		-	20
Latvia	-	36	-	7	35
Lithuania	97	3	33	16	103
Luxemburg	-	-	-	-	-
Hungary	433	6	-	4	75
Malta	-	-	-	-	-
Netherlands	526	9	289	-	772
Austria	743	70	10	32	39
Poland	285	248	188	148	44
Portugal	832	20	20	-	-
Rumania	250	49	4	-	75
Slovenia	155	12	-	-	17
Slovakia	287	32	6	7	33
Finland	728	63	-	49	-
Sweden	827	105	94	17	5
GB	7 410	307	173	-	378
Norway	424	26	10	17	-
Switzerland	471	87	99	48	185
Montenegro	8	1	-	-	-
Turkey	1 326	31	129	46	631

Source: Authors´ own processing, data downloaded from Eurostat, 2016. [online]. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/ File:Production_and_use_of_milk,_EU-28,_2014.png.

The following Table 2 illustrates the production of cheeses in 1 000 tons in individual European countries. The largest producer in recent years is France, Germany and Italy. In Slovakia, 33.27 tons of cheese are produced in 2016.

Table 2 **Cheese Production in 1 000 Tons, in 2016**

	Cheese Production in 1 000 t		
Belgium	84.8	Lithuania	103
Bulgaria	77.4	Luxemburg	-
Czech Republic	116.6	Hungary	75
Denmark	368.9	Malta	-
Germany	1 892.8	Netherlands	771.9
Estonia	40.5	Austria	172.4
Ireland	118.4	Poland	743.7
Greece	190	Portugal	73.4
Spain	388	Rumania	74.6
France	1 949	Slovenia	16.6
Croatia	32.2	Slovakia	33.3
Italy	1 176	Finland	217.3
Cyprus	20	Sweden	88.1
Latvia	34.7	GB	378

Source: Authors´ own processing, data downloaded from Eurostat, 2016. [online]. Available at: http://ec.europa.eu/eurostat/tgm/mapToolClosed. do?tab=map&init=1&plugin=1&language=en&pcode=tag00040&toolbox=-types#.

Available processed data from Eurostat or Statista portals present, the cheese consumption in EU countries is slowly rising, the curve has an ascending character from 2007 until to 2016 in 17.1 kg of cheese eating per person in 2016. European cheese production is considerably higher than consumption between 2000 and 2016, an increase of more than 156 % since 2009. The percentage of cheese production is on the export 'increase. In EU-28, 8 % of cheese production was exported in 2016. This share grows slowly from 6 % up to 8 % (Kubicová, Kádeková & Dobák, 2014). The largest consumers of cheeses were Greece, Luxembourg, France, Germany and Italy with more than 22 kg/ per person in 2014. On the other hand, Romania, Bulgaria, Ireland, Spain, Malta, Portugal, Slovenia and Slovakia consume less than 10 kg/ per person in 2014. The current statistic

(Table 3) shows per capita consumption of cheese by country in 2016. Denmark had the highest per capita consumption in the EU-28 in the year 2016. For a contrast, in Iceland, the consumption was 27.7 kg, the lowest world consumption was in Asian countries (f.e. in China 0.1 kg), in Middle East (f.e. in Turkey 7.8 kg) or in Africa (f.e. in South Africa 1.9 kg) (Statista, 2017).

Table 3 **Chesse Consumption/ Per Capita in 2016, in kg**

	Cheese Consumption in 1 000 t		
Belgium	15	Lithuania	17.4
Bulgaria	15.6	Luxemburg	5.2
Czech Republic	17.6	Hungary	13.2
Denmark	28.1	Malta	2.2
Germany	24.7	Netherlands	21.6
Estonia	20	Austria	21.1
Ireland	8.6	Poland	17.3
Greece	19.7	Portugal	8.7
Spain	9	Rumania	14.1
France	27.2	Slovenia	11.7
Croatia	13	Slovakia	14
Italy	21.5	Finland	27.3
Cyprus	26.7	Sweden	20.5
Latvia	19.8	GB	11.7

Source: Authors´ own processing, data downloaded from Statista, 2017. [online]. Available at: https://www.statista.com/statistics/527195/consumption-of-cheese-per-capita-worldwide-country/. Canadian dairy information center, 2017. Online. Available at: http://www.dairyinfo.gc.ca/index_e.php?s1=dff-fcil&s2=cons&s3=consglo&s4=tc-ft.

1.2   Neuroscience in Marketing Research

New discoveries in the neuroscience represent the revolution of the 21st century and marketing is not an exception. Marketers are more and more skeptical of using traditional research methods because they represent a limitation of an effective measurement of internal reactions to external stimuli. Consumer's neuroscience is increasingly becoming a field of interest both for researchers and for

the business area, because it provides additional, better information than the traditional marketing methods; it also proves useful and effectives in understanding the consumer behavior and reasoning whenever making decisions. Neuromarketing emerged on the background of traditional marketing methods' not being deemed satisfactory any more, not only by scientists, but also by the business area (Vlăsceanu, 2014). Neuromarketing, mainly acts as a promise, for it conjures up visions of startlingly new insights into consumers 'minds and a grand unification of disparate approaches to the research of consumer behavior. Neuromarketers believe that their instruments allow for the direct observation of brain processes, with the brain acting as the organ of (buying) decision-making (Schwarzkopf, 2015). Final state that people experience cannot be measured adequately by self-reported verbal indicators, because of their complexity and non-propositional structure. (Davidson, 2004). It is concluded from many researches that threshold of human conscious perception starts to be fully active 300 ms after the stimuli what means that most of activities lasting less cannot be adequately and verbally evaluated (Libet, 2004). The base for the neuromarketing research is a finding that 95 % of human thinking and activities are happened in the subconscious (Kozel et al., 2011), what adds the fact that sophisticated brain imaging and biometric methods can penetrate into the subconscious consumer processes and are being brought to the foreground.

1.3   Methods of Measurement of Biometric Signals

Neuromarketing singularly privileges data derived from neurophysiological measurement devices. At its heart are techniques that record electrical activities in the body (mainly electroencephalogram or EEG, and galvanic skin response or GSR), metabolic activities (positron-emission-tomography or PET, functional magnetic resonance imaging or fMRI) and finally psychophysiological processes such as eye movements, heart rate, breathing frequency and the activity of facial muscle (Schwarzkopf, 2015). Biometrics is a universal term which represents measurement of physiological responses of a body - not brain directly - to external stimuli perceived via senses. From the point of view of neuromarketing, one of the most used biometric measurements is the heart and breathing activities, eye movements, blinking, galvanic skin resistance (GSR), mimics and body movements. Some biometric measurements are limited to purposes of neuromarketing research because they are delayed indicators (indirect measurements) of primary brain activity while brain can give an order to body ahead enough of a physiological effect. An ideal case is a finding when the brain gives the order not only when it is being conducted (Pradeep, 2010).

2   Data and Methods

This paper is based on the study of existing knowledge in the following areas:
- traditional vs. innovative research tools;
- market research by using of biometric methods;
- new possibilities gathering the feedback from customers;
- distribution and placing of various research methods and developing of patent technology;
- the need for the implementation of consumer neuroscience in market research and decisions making.

The result of the study finalizes the definition of main reasons needed to implement innovative market research methods to increase the denunciation of these studies, to evaluate their use in marketing management and to obtain feedback from real conditions. All these tools and methods could be used by measurement of dairy products from the various view and research plans. The data for this paper was drawn from authors 'own development and are basically primary data developed for innovative research activities.

3   Results and Discussion

The luxury brand *Bentley* developed an application to help them to solve the problem of selecting the right model of the *Bentayga SUV* based on facial expressions. The *"Inspirator"* application, which is not available at this moment, has then scanned the face of potential prospects while watching various video stimuli for wheel, color, and interior adaptation. Simply put, the aim was to choose the best possible performance of the aforementioned car by subconscious perception. While the app was the best and fun tool for those who could afford to purchase a car in $ 300,000 (244 379,28 €), it was not mean as a science-based method for recognizing true preferences and emotions. Nonetheless, the technologies that can read the human emotions are becoming increasingly widespread and the marketers are aware of them because emotions play an important role in making a purchase decision, so emotional analyzes are added value for marketers and people working in the marketing sphere. Despite the fact that 95 % of purchasing decisions take place in subconscious mind, the understanding of this process is of key importance for any business. Putting digitized surveys directly at the point of sale or in the business is not a revolutionary novelty and is quite often used. Their automation and expansion of biometric feedback (by monitoring the face expression) is a matter of the present time. The reason is that people often do not

think about the question in answering in various surveys or questionnaires and give a response only on the basis of convenience (such as a button that´s within reach, smiley coloring) or simply are not in the mood to think over the question as to the number of tasks and duties that they have to deal with in everyday life.

Propose of device with a function of attract an attention, distant gesture control, recognition of selected aspects and micro emulsions available on the dairy market

The modified panel/ kiosk can scan people who are in the sales department of milk and dairy products through the Kinect One device, see Figure 1.

Figure 1 **Kinect One Device**

Source: Čížek, 2017. [online]. Availabe at: https://www.zive.cz/bleskovky/kinect-definitivne-konci-microsoft-oznamil-zastaveni-dalsi-vyroby/sc-4-a-190163/default.aspx.

If no persons are present in this sales area, the device is in offline mode, possibly can display/ record a universal stimulus aimed at increasing the consumption of milk products (Figure 2).

Figure 2 **Special Modified Kiosk Without Kinect One Device**
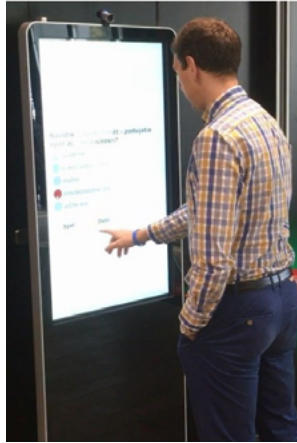
Source: Authors´ own processing.

If the device detects nearby the person, for example, in 4-8 meter then it launches the action of attracting attention. Attraction of attention can be achieved by displaying the personality of a human on the display of the panel/ kiosk and adding a graphic element (e.g. a t-shirt with a dairy motive, a cap in a cheese type) to portray a passing man. Likewise, the device can trigger the projection of floor graphics (various floor graphics related to milk issues) in the space in front of the panel/ kiosk with the capture of the respondent´s position within the presented graphic points in order to trigger the interaction. At the same time, the device can trigger a sound condition such as "cow sound" (not active) or pre-recorded talk, aromatization (flavored milk scent) or change the color of LEDs (see Figure 3). The interaction itself may also be that the device asks the passer-by for an inter-action (asking for a smile if it is frowning, or asking for a mood that is expressed in a smile). While the panel/ kiosk attracts attention, it records information about gender, muscular activity, age, attitude, and possibly emotion (if the majority of people adapt to prevalence (e.g. 3 males and 2 females = males or 4 adults and 1 child = adult).

Figure 3 **Monitoring of Skeleton, Orientation and Virtual Functions**

Source: Authors´ own processing.

Based on these aspects, the device then assigns pre-arranged and prepared marketing incentives and surveys. This means that after a successful interaction, the device associates or displays a stimulus (video, image, animation, research) for a particular gender (male or female). In the same way, consideration is given to age (child vs. adult) or emotions (happy, angry). The device may also receive additional information, e.g. the weather from the internet or other sensors need-ed to illustrate the situation (side sensors, etc.). In this context, it is also necessary to consider several modes (e.g. in the morning the device collects information such as the perception of advertising of acid-milk products, on the lunch about the ad of cheeses and on the dinner about a milk). Once the stimulus is triggered, the device will automatically start recording the face expression, recording the exact start and end time of the recording (start & end time). The device must be modifiable if the device uploads the entire video while viewing a stimulus or only takes a photo at the beginning (e.g. one photo when viewing a picture and other photo when viewing a single-question questionnaire or one video when viewing an ad and one video when filling out a more-questions questionnaire). Eventually, the device can also add information about the nervousness of the participant (not moving and looking at the concentric vs. still rotating in front of the panel) or the pulse activity (for the future) of the video (in the time database with the exact vid-eo designation), see the Figure 4. If a person leaves during the playing a marketing stimulus before leaving for 10 seconds (ideal playable), this video / photo will not be saved. It is also necessary for the device to send or not sent a questionnaire. It is needed if the participant persists, for example, only when watching the ad and

not by survey, this fact must be mentioned in a document with information about time, nervousness, etc. At the same time, it is necessary for the panel/ kiosk to react to the fact that if one to see the stimulus in question and possibly a poll), not to offer the same scenario, but alternatives.

Figure 4 **Overview of Main Functions of Panel**
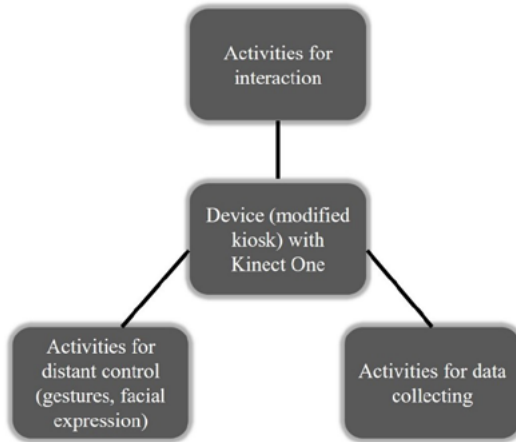
Source: Authors´ own processing.

In the future, it is also planned the possibility of response by means of gestures (e.g. the imaginary like-ing or virtual marking of the right answer or smile). In practice, this means that a person does not have to approach the device at all and can do anything in the range of 1-8 meters. The question responded in this way is answered based on the above-mentioned facts (gender, 1 / more people, emotions, etc.).

4   Conclusion

Based on biometric face detection, we can determine the relevancy of the response, especially from the point of view of the attention, the perception of the question itself and the corresponding answers (e.g. a positive answer with a disgusting facial expression). By using such results, this new technology helps to make better decisions and eliminate the shortcomings of traditional research tools. In addition to the level of attention / activity, the device can also recognize the emotional tune of a person (positive, neutral or negative), which is important to watch, for example, when different ads, interesting pictures, infographics, or

animations are displayed on the presentation device. In this case, it is possible to monitor the overall emotional behavior of the person standing in front of the panel and looking at the given stimulus. Even though neuromarketing and modern information technology have become increasingly popular over the past decade in gaining feedback from customers, many companies still rely on classical surveys and written feedback to better understand their customers, but they may not provide relevant information about their true preferences.

Acknowledgements

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THE MARKET FOR FARMERS' FOOD PRODUCTS IN THE CZECH REPUBLIC

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Abstract

The purpose of writing this article is to characterize the market with farm-produced and premium food products in the Czech Republic and to express its current structure in terms of the ownership of the decisive companies in the given market. The originality of this article is based on the application of the model of monopolistic competition into the conditions of the market with farm-produced and premium food products in the Czech Republic. The methodology used for writing the article is based mainly on the description of individual market entities offering farm-produced food products in the Czech Republic. It is also based on a comparative analysis of the development of indicators signifying the number and financial performance of the monitored companies in the recent years. The Sklizeno Foods grocery store network has become a clear leader in the growing market of farm-produced and premium food products. In 2018, it was supposed to include 80 establishments, and the turnover should reach the amount of CZK 750 million. However, it will still be a small fraction of the total food consumption in the Czech Republic, as the local products and organic food do not currently reach even one percent.

Keywords: *businesses, farm-produced and premium food products, farmer's markets, market, monopolistic competition*

JEL Classification: *D12, Q12, Q13*

1   Introduction

The topic of food quality is still topical and is still much discussed among experts. The term "food quality" includes a whole set of partial aspects (parameters) that are related or linked to each other. Examples include nutritional, hygienic,

sensory and technological aspects or more complex aspects as regional food brand (Rojík et al., 2016). The perception of food quality is largely dependent on subjective consumer assessment and is related to their perception of quality parameters and previous experience (Pilař et al., 2017). For this reason, it cannot automatically be assumed that safe food will always be perceived as good by the consumer (Recskyová, 2015). „Consumers' requests and wishes are important, and their fulfilment is strictly related to retailers' choices and activities aimed at shaping consumers' choice" (Marchini et al., 2015).

The creation of marketing channels selling quality farm products is certainly not new (Verhaegen & Van Huylenbroeck, 2001). In southern countries such as Italy and France with their rich gastronomic traditions and diversity of local products, such commercialisation chains have always existed (see e.g. Fanfani et al., 1996; Brasili et al., 1998; Arfini & Mora, 1998; Bessiere, 1998). In these quality food channels, direct communication between producers and consumers is of paramount importance to ensure that quality is paid for. In the last decade, however, they have emerged in all industrialised countries, where they are promoted as a possible model to respond to the actual problems faced by agriculture (Hinrichs, 2000). Battershill and Gilg (1998) and Grey (2000) present them as a possible alternative to the industrialised food market.

The purpose of writing this article is to characterize the market with farm-produced and premium food products in the Czech Republic and to express its current structure in terms of the ownership of the decisive companies in the given market. The originality of this article is based on the application of the model of monopolistic competition into the conditions of the market with farm-produced and premium food products in the Czech Republic.

2   Data and Methods

2.1   Methods

The methodology used for writing the article is based mainly on the description of individual market entities offering farm-produced food products in the Czech Republic. It is also based on a comparative analysis of the development of indicators signifying the number and financial performance of the monitored companies in the recent years.

2.2 Monopolistic competition in the area of farm-produced and premium food product sales

Monopolistic competition generally represents a situation in the market where many small and medium-sized businesses sell products that are similar, but not the same. „The main symptom of monopolistic competition is product differentiation" (Maksimov et al., 2016). „The determining conditions of its existence are the different consumer preferences towards the products or services of a single firm" (Soukup & Šrédl, 2011). In the context of imperfect competition, monopolistic competition is the market structure most reminiscent of perfect competition. The primary aspect that makes it reminiscent of perfect competition is that it presupposes a large number of businesses on the market and considerable freedom in the transition of companies across sectors. However, this form of competition also has a mark of imperfect competitive, namely the production of a differentiated product (as stated by Maksimov et al.) and the ability of a business to set its price. „In monopolistic competition each company has its own clearly distinguished identity – a trademark. Customers understand its output as something else than outputs of all other companies in the production sector" (Schiller, 2004). As pertains to its product, a business in the area of farm-produced and premium food products thus holds the same position and power as one operating in a monopoly market. A large number of companies in the sector, the production of a differentiated product and the absence of barriers to the entry of companies into the sector are the main prerequisites that allow the monopolistic competition model to function in a given market segment.

Seemingly, the demand curve that monopolistically competitive companies are facing looks like the demand curve that monopoly is facing… However, „in monopolistic competition each company has monopoly only on its own trademark; it still competes with other companies by offering close substitutes. Therefore, the extent of a monopolistically competitive company's power depends on how successfully it is able to distinguish its product from products of other companies. The greater loyalty to a brand the company is able to ensure, the less probability there is that customers will change the brand when price increases. In other words, loyalty to a brand makes the demand curve the company is facing less price flexible" (Schiller, 2004).

„Loyalty to a brand exists even when products are practically identical. Poppy is a very standardized product, yet many customers of farmer's markets regularly buy one specific brand, for example poppy from František Němec from Netín, who operates three stores in Prague, where he sells it" (Svoboda & Severová, 2015).

3   Results and Discussion

3.1   Structure of farm-produced and premium product stores and further investments in these stores

The plans of merchants offering farm-produced and premium food products for extensive expansion are falling behind. Sellers are complaining about the lack of suitable space and insufficient product assortments. However, the expansion of stores is beginning to hit limits not only in terms of demand. It is also slowing down due to the limited availability of these products on the market.

There is certainly room for the use of farmer-produced food products on the market, but it is of course not all that large. Even in this segment, it holds true that demand is limited and that the supply will one day be comparable to the demand. For example, the pioneer of farm product shopping *Náš grunt* had 33 stores in February 2015 (see Figure 1) and has discussed starting up another ten. However, taking a look at the company's website (2018) today shows that it has only 13 stores in the network. The company has already said previously that the problem lies in the lack of suitable space (Novák, 2015a).

Figure 1 **The number of stores under Sklizeno Foods**
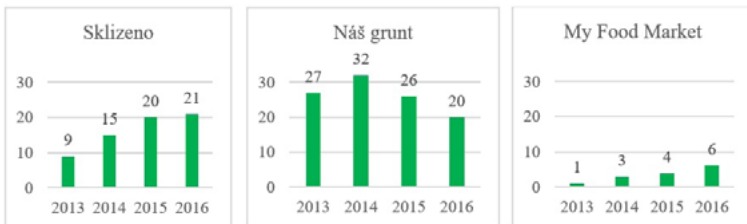
Source: Sklizeno Foods, 2017.

The competitive farming network *Sklizeno* had planned to open farmer's supermarkets. However, it has not yet realized its intention. In addition to the lack of suitable locations, the company also ran into the problem of a lack of farm products offered by producers.

The company *Delmart*, which is owned by Dušan Mrozek, the former head of the domestic part of the Marks and Spencer fashion chain, has not yet realized its initial plans either. Delmart is not a standard farm product store. It focuses on high-quality food products in general. When the first store was opened in August 2015, the entrepreneur Mrozek said that opening twenty stores in a two-year horizon can be realistically expected. So far (2018), the company has only five stores (DELMART, 2018). In 2015, Delmart focused mainly on further improvements in

the product assortment, an evaluation of the experiences acquired from operating the first store, and on putting the logistics, information and reporting systems and a managerial structure, i.e. a solid and robust foundation for expansion, into place (see Figure 2).

Figure 2 **Other networks of farm produce stores**
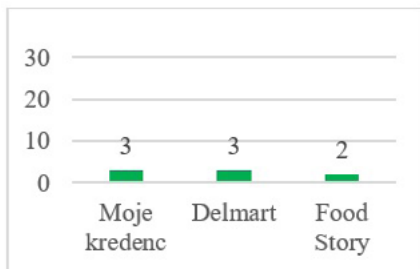
Source: Sklizeno Foods, 2018.

Merchants that are focused on high-quality food products are, nonetheless, looking for new ways to expand their business. These include shopping centres in which stores such as Pekařství Mašek from Jablonec nad Nisou and *My Food Market* from Brno operate. After Brno, the network will also expand its businesses to "A-grade" shopping centres in Prague. The second new sales method is e-shops. It can be either the store's own e-shop in which, again, My Food Market is promoted or sales through cooperation with large players such as the Rohlík Internet supermarket; the e-shop that cooperates with Sklizeno (Novák, 2015a).

A positive fact is that networks offering farm-produced and premium food products are not yet going bankrupt in the Czech Republic, with the exception of the Austrian store Julius Meinl, which differed from other stores in that it had high prices. The company did not last a single year in the vast luxury food store near Wenceslas Square; it was, however, an extreme case in almost every aspect since the very beginning of its operation.

The company My Food Market from Brno, into which the co-owner of the consultancy company Partners Petr Borkovec invested capital, launched a large investment project. In 2015, he invested several tens of millions of crowns into building new premises and expanding the facilities of the kitchens, factories, warehouses, IT and especially into professional staff. Delmart, the company owned by Dušan Mrozek, is investing tens of millions as well. It is also building a delicatessen and pressed juice establishment, and it will also open a bakery for its own needs (Novák, 2015a).

3.2   Farm-produced food product stores merging into Sklizeno Foods

In previous years, farm-produced food product stores had merged in the Czech Republic, and the new food market leader Sklizeno Foods had emerged. In the spring of 2016, the investor Petr Borkovec joined the network of local food produce stores Sklizeno by investing capital in the enterprise. In November 2016, he also bought the largest competing network Náš grunt, which included 20 stores throughout the Czech Republic.

The Náš grunt network of farm stores was established in 2010, and it is one of the pioneers in moving the sale of food produced by local producers from the popular farm markets to brick and mortar stores. The network currently includes over thirty stores made up of a mix of its own stores and franchises. In 2015, Náš grunt has reached 157 million crowns in annual revenue (see Figure 3). As a growing business, it strives towards a balanced economy. Profit is not the short-term goal of the owners; they are now trying to invest everything into the development of the company (Novák, 2015b).

Figure 3 **The turnover of parts of Sklizeno Foods in millions of CZK excluding VAT**
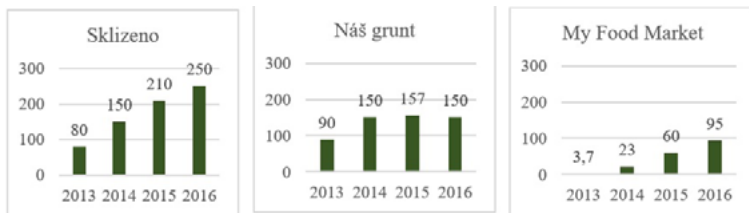
Source: Sklizeno Foods, 2017.

The Sklizeno Foods network of farm-produced food products, which also includes the original brand of Petr Borkovec My Food, has become a clear leader in the growing market for farm-produced food products in the Czech Republic. In 2016, Sklizeno Foods was to operate nearly 50 stores and the company's turnover was to reach nearly half a billion crowns. The newly formed network should expand even further, whether it be through franchises or brick and mortar stores. In 2017, it planned to open at least ten new stores, and in 2018, the network should already be comprised of 80 stores. The turnover was to reach 750 million CZK in 2017 (Petříček, 2016).

However, it will still be a small fraction of the total food consumption in the Czech Republic, as the local products and organic food do not currently reach even one percent. The market can be expected to reach three percent within eight

years and thus reach a turnover of around nine billion crowns, as the founder of Sklizeno David Kukla, who has a nearly one-third share in the new Sklizeno Foods network, has stated.

Figure 4 **The owners of Sklizeno Foods following the stores had merged**
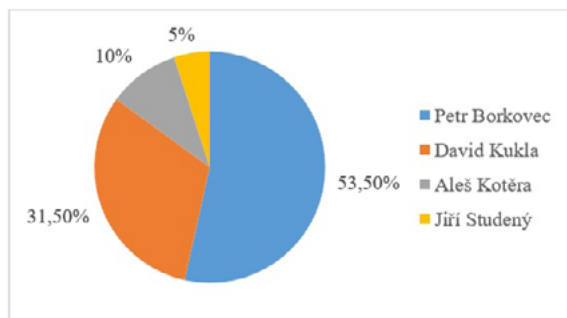
Source: Sklizeno Foods, 2018.

"In the modern market economy where the supply exceeds demand, the importance of the "consumer's behaviour in the market analysis" continuously increases" (Šrédl et al., 2013). There are around 600 separate health food stores, and they are usually not part of any chain, because "food supply chains are primarily focused on selling products to standard consumers" (Svoboda & Kopecká, 2017). The division is not very beneficial for the market, because it makes local food products more expensive. There are several explanations for what attracts customers to health food stores. The demand for gluten-free and lactose-free foods and so-called superfoods is increasing among Czechs. Many Czechs are interested in various dietary styles (such as the raw or paleo diet), and the demand for foods that are free of palm oil is growing. "The choice of foods is an area of concern for many people involved in the production and distribution of foods, and for those concerned with nutrition and health education. Relatively little is known about how and why people choose the foods that constitute their diets or about how their choices can be influenced in an effective way" (Benda-Prokeinová et al., 2017).

Delmart also builds on a concept of "better" food similar to that of Sklizeno Foods, and it has opened its third store in the centre of Prague near Náměstí Republiky in November 2016. However, the expansion is slower than planned by its owner Dušan Mrozek when he opened the first premium food store and bistro in Anděl, Prague three years ago.

3.3 Alternative sales of farm-produced and premium food products

3.3.1 Brick and mortar stores

The popular shopping in farmers' markets led to booms for brick and mortar stores. However, merchants selling farm-produced and premium food products are facing the problem of the limited product assortment of suppliers as well as the lack of space suitable for networks of brick and mortar stores. The demand for the food products known from farmers' markets has its limits as well. As a result, the extensive plans for expansion are falling behind, and not only the major players have to find new ways to expand their business. Penetration into established shopping centres and e-shops may present an opportunity.

3.3.2 E-shops

Food products from domestic farmers will also reach customers through various e-shops and delivery services. There are, for example, several companies engaged in community-supported agriculture. Under the Mléko z farmy (Farm Milk) project, a joint project of the landowners Jan Miller and Stanislav Němec, milk is delivered around Prague and other parts of the Czech Republic. The annual turnover exceeds one hundred million crowns (Petříček, 2016).

3.3.3 Farmers' markets

The farmers' markets, whose total turnover is around 250 million crowns, are another alternative. However, Sklizeno Foods does not consider farmers' markets as direct competitors. It considers them more as a nice one-time events with a certain atmosphere. For many real farmers, the markets are getting increasingly demanding and expensive. However, Sklizeno Foods sees large chains as its competition.

3.4 The opportunities and risks involved in the farm-produced food sector

Opportunities for development:
- penetration into shopping centres
- using the stable position of businesses
- cooperation with e-shops

Risks involved in company development:
- limited product assortment of farm-produced food product suppliers

- lack of suitable space for stores
- limited demand for farm-produced food product

3.5   The practical importance of received results

The description of the current structure of the market with farm-produced and premium food products in the Czech Republic can serve potential bidders for entry to the market for their better understanding of this market. At the same time, the article informs the existing entities on the given market about the possibilities of further expansion of their business activities.

4   Conclusion

The Sklizeno Foods grocery store network has become a clear leader in the growing market of farm-produced and premium food products. In 2018, it was supposed to include 80 establishments, and the turnover should reach the amount of CZK 750 million. However, it will still be a small fraction of the total food consumption in the Czech Republic, as the local products and organic food do not currently reach even one percent. There is certainly room for the use of farmer-produced food products on the market, but it is of course not all that large. Even in this segment, it holds true that demand is limited and that the supply will one day be comparable to the demand. . However, the expansion of stores is beginning to hit limits not only in terms of demand. It is also slowing down due to the limited availability of these products on the market. Merchants that are focused on high-quality food products are, nonetheless, looking for new ways to expand their business; these include shopping centres. Farmers' markets or the sale of farm-produced food products through various e-shops or delivery services present an alternative method of getting food from domestic farmers to customers.

Acknowledgements

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CONSUMER BEHAVIOUR ON THE MARKET OF DAIRY PRODUCTS: CASE STUDY OF SLOVAK SENIORS

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Abstract

The main objective of submitted paper was to examine consumer behavior of Slovak seniors on the market of dairy products. All necessary data and information were obtained through a questionnaire survey, which was conducted on a selected sample of respondents who were seniors aged 60 to 90 years. The questionnaire survey was carried out specifically across the Nitra region in November and December 2017. Obtained data were analyzed by using Excel and programming language for statistic R. For a deeper analysis of the data, we have formulated several scientific assumptions. The accuracy of the scientific assumptions was verified by using the Chi-Square Test of Independence, Kruskal-Walis Test, ANOVA and Mann-Whitney Test. Research proved that Slovak seniors mostly consume dairy products such as milk, sour milk products, and yogurt drinks. The main reasons for consuming these dairy products include, especially, taste, health point of view and habits. According to the frequency of consumption of their selected dairy products, most respondents consume these products more than once a week and for breakfast. We also examined the impact of the country of origin on the consumer behavior of seniors. We found out that seniors recognize the origin of the product as important factor decision-making process, regardless its price. Our research shows, that importance of factors in the decision-making process is not dependent on consumer´s gender. Based on our research, we can conclude that all income groups spend the same amount on dairy products in average, but the lowest one is strongly affected by price discounts when buying dairy products.

Introduction

Milk products are among the most important products of livestock. These products are rich in energy, proteins, carbohydrates, cholesterol, vitamins, riboflavin, calcium and other materials that are beneficial to human health (Rahnama & Rajabpour, 2017). Rozenberg, Body, Bruyère et al. (2016) report that many countries have nutritional recommendations for 3 portions of dairy products per day, such as 1 cup of milk, 1 portion of cheese and 1 yogurt. Hatirli, Ozkan, and Aktas (2004) argue that milk is the most nutritious food for people because it contains almost all nutrients. According to vumza.sk (2018), milk is the first food we meet after birth and accompanies us all our lives. It is one of the basic foods for all age groups of the population, given the irreplaceable importance of its biological value in ensuring the proper nutrition of the population. Kurajdová, Táborecká-Petrovičová, and Kaščáková (2015) identified 4 important motives related to milk consumption. The first motive is its nutritional composition, then its beneficial effect on human health and serves as a prevention against many diseases, the third and fourth motives are the tradition and use of milk itself. Kubicová and Kádeková (2011) state that fermented milk products play an irreplaceable role in human nutrition. Fermented milk products are mostly made from cows´ milk but can also be made from sheep´s milk or goat´s milk. According to Kearney (2010); Zingone, Bucci, Iovino, and Ciacci (2017), the problem is, that in the last few decades milk consumption has significantly decreased especially in developed countries. On the other side, authors Tolosa, Verbeke, Piepers et al. (2016) report that the consumption of milk and dairy products is increasing in developing countries. The main reason is population growth and urbanization. Kubelaková and Šugrová (2017) state that the position of milk in the food of population is a very hot topic in food discussions in the Slovak Republic. Consumption of milk in Slovakia is currently below the recommended daily doses. Milk consumption is, according to Bongard, Ruidavets, Simon et al. (2012) associated with reducing the risk of death, irrespective of the main reasons, for example, age, poor diet, other health problems, educational and socio-economic status. Kubicová and Habanová (2012) argue that the recommended dose of annual milk and dairy products is 220 kg. The current development of milk and dairy products consumption can be considered negative. In the past decade, we have observed a concave increase of

milk consumption, particularly with a higher added value of dairy products, yogurts and cheese. Consumption of milk and dairy products in the Slovak Republic ranged from 164.3 - 170 kg per capita per year between 2015 and 2016. In the long run, milk consumption per capita in Slovakia is constantly decreasing. According to dairy products, we can see an increasing trend (vuepp.sk, 2017). Košičiarová, Nagyová, and Holienčinová (2017) report that in the developed countries the consumption of these products is around 300 kg per capita. Compared to Western and Eastern Europe, the consumption of milk fermented beverages in Slovakia is about three times higher than the consumption of cheeses, which is higher twice. As state Esmerino, Ferraz, Tavares Filho et al. (2017); Reynolds and Olson (2001); Savage (2003), consumer decision making is a difficult process, and consumer choices cannot always be explained. This also applies to the purchase and consumption of foods that are influenced by sensory and non-sensory properties. Understanding consumer perception, decision making, buying is a key factor for retailers. Authors Grunert (2005); Kumar and Babu (2014) state that consumers perceive the quality of milk and dairy products of several perspectives and not only based on senses. The authors argue that regarding perceive of dairy products quality, consumers are interested in sensory attributes such as taste or aroma, health aspect, comfort attributes and process attributes (manufacturing processes such as organic, animal welfare or genetic modification, etc.). Regarding the factors influencing knowledge, attitudes, decisions about diet, Pieper, Doherr and Heuwieser (2016) include here age, gender, education, place of residence, and whether the consumer has children. According to Kubicová and Kádeková (2012), the products quality of many food products is unknown before purchase and it is not certain that we are buying a quality product. Quality can only be assessed by consumers after their consumption. As state Kubicová, Kádeková, and Dobák (2014), the purchasing power of many households currently does not allow us to satisfy demand not only for food but also for other basic products. Nagyová, Stávková, and Kádeková (2013); Kubicová, Nagyová, and Kádeková (2013) report that the quantity and price level of food and services provided by people depend mostly on the amount of disposable income. Their disposable income currently does not allow full satisfaction of demand for food. Food expenditure is an important part of this expenditure. Singh and Kathuria (2016) add that people with lower incomes generally buy low-quality, unhealthy and non-branded foods. Kubicová, Kádeková, Nagyová, and Rovný (2017) argue that consumption of fresh dairy products is the second driving force for dairy products in the EU. Consumption of cheese plays the most important role for consumers aged 18 to 65, while for children the main sources of calcium are milk and dairy products whose share increases in age groups over 65 years of age.

Data and Methods

The main objective of submitted paper was to examineconsumer behavior of Slovak seniors on the market of dairy products. Primary data was obtained by conducting a questionnaire survey in Slovak Republic. The questionnaire survey was executed from November to December 2017 on a sample of 215 respondents chosen randomly. The questionnaire survey was attended by respondents – seniors aged 60 to 90 years from Nitra region. In order to ensure the representativeness of the results, we applied the random selection and geographic diversification of our respondents. The questionnaire was conducted over the personal survey and consisted of 15 questions divided into two parts, the first part consisted of classification questions through which we surveyed basic data on respondents. The second part of the questionnaire related to the issues examined. Obtained data was analyzed by using statistical programming language – R and Excel program and were applied following statistical methods: Man-Whitney Test, Chi-squared Test of Independence, ANOVA and Kruskal-Wallis Test. For deeper analysis we formulated 4 scientific assumptions:

Assumption 1: We assume the dependence of factors importance perception on gender.

Assumption 2: We assume the dependence on perception of product´s origin and price.

Assumption 3: We assume the dependence between expenditures on dairy products and consumers´ income.

Assumption 4: We assume influence of consumers´ income on perception of price discounts.

Results and Discussion

Research population is created by over 140,000 seniors living in Nitra region. The statistical sample comprises 215 respondents, who took part in the questionnaire survey during autumn months of 2017. The sample was determined on the 95% confidence level with a consideration of the confidence interval not higher than 7%. Majority of respondents were women (62,8%) and 37,2% of men took part in the survey research and the respondent's age is ranged from 60 to 90 years. The greater part of respondents (82,3%) comes from a city, the rest (17,7%) from the village. From the point of view of education, most respondents (61,8%) reached secondary education, only 12,6% finished elementary school, and the rest finished a degree in higher education.

Respondents were asked to assess importance following factor affecting purchase process of dairy products on the side of the consumer: utility benefit, taste, quality, price, brand, producent, origin, advertising, recommendation, price discounts and discount offers. We have investigated if there is a difference in motivation to buy a dairy product based on gender. Using Man-Whitney Test we have found no difference based on gender except utility benefit (P-value: 0,049), which is considered of higher importance by women. According to limit P-value, we can take into account that all factors all decisive for both genders.

Figure 1 **Utility benefit assessment of dairy products based on gender**
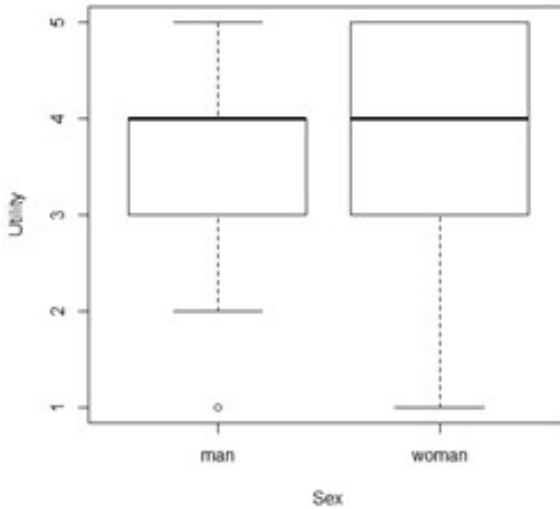
Source: Own processing, 2018.

Most respondents are aware of the country of origin when purchasing dairy products as clear from Figure 2. We can assume that seniors are influenced by the global trend of awareness of the country of origin as the very important factor in food consumption. This is underlined by finding of consumer's awareness of the product's origin regardless its price (Chi-squared Test of Independence, P-value: 0,805), which shows that consumers do not rely on a stereotyped assumption about more expensive products guaranteeing higher quality and fewer preservatives and other substances used during food processing.

Figure 2 **Dependence on price and origin perception of dairy products**
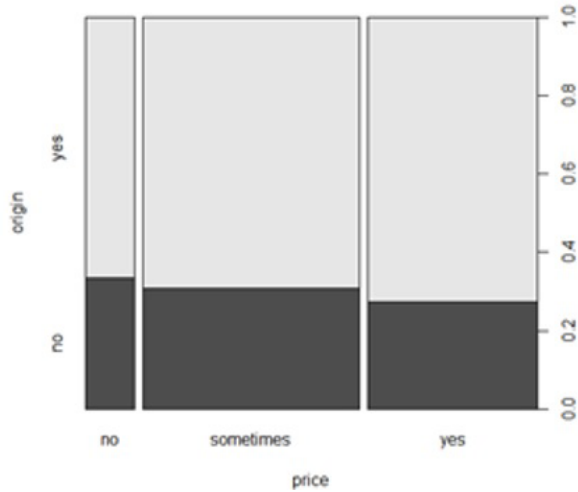
Source: Own processing, 2018.

Our research has found no relationship between senior's income and their expenditures on dairy products. Based on this finding we can claim similar expenditures among all income groups, which is underlined by ANOVA P-value 0,819. The distribution of expenditures based on respondent's income is shown by the following box plot (Figure 3).

Figure 3 **Dependence of income and expenditures on dairy products**
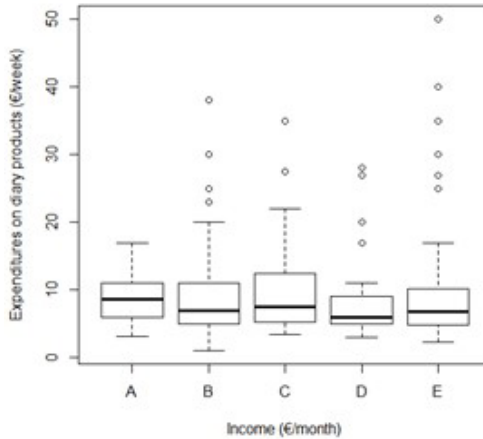
Source: Own processing, 2018.

Using Kruskal-Wallis analysis of variance (P-value: 0,008), we found the difference of price discount among income groups of respondents. As it is clear from Figure 4 mentioned dependence is caused by the higher preference of discounted products by seniors with the lowest income (Group A). However, this finding is not contradictory with the fact about the independence between income and expenditures on dairy products. Discount campaigns are many times only illusion and the special price is not always lower than the normal price of a substitute product that consumers do not take into account in this case.

Figure 4 **Income influence on perception of discounted produ**
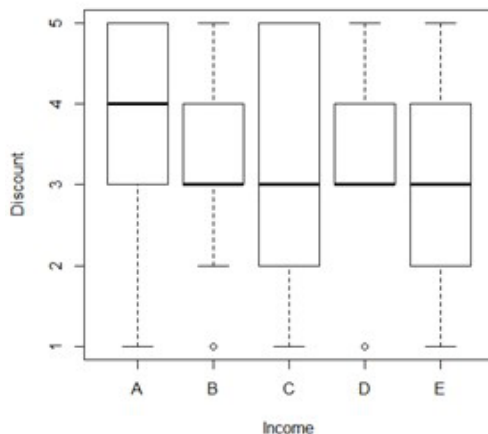
Source: Own processing, 2018.

When evaluating preferences of individual dairy products, we found that seniors consume milk, in the average 2,64kg per week. It could be caused by a wider usage of milk itself in comparison with other kinds. Fermented milk products are also preferred by seniors with average weekly consumption 1,43kg. Yogurt drinks are preferred over classic yogurts, which can be influenced by its longer the best before period and also by health aspect.

Figure 5 **Average consumption of dairy products in kilograms per week**
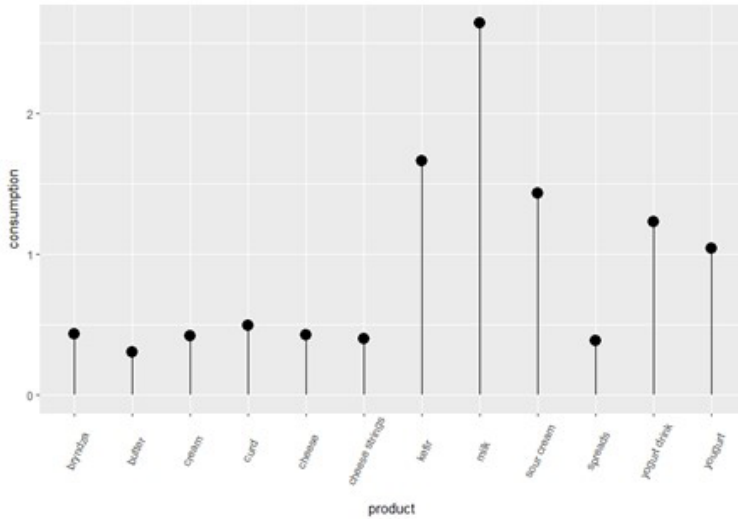
The frequency of dairy products consumption is illustrated by following Figure 6, where are shown the percentage of consumptions frequency for each product by respondents, who were asked to choose if they use the specific dairy product daily, several times a week, several times a month or rarely.

Figure 6 **Consumption frequency of specific dairy products**
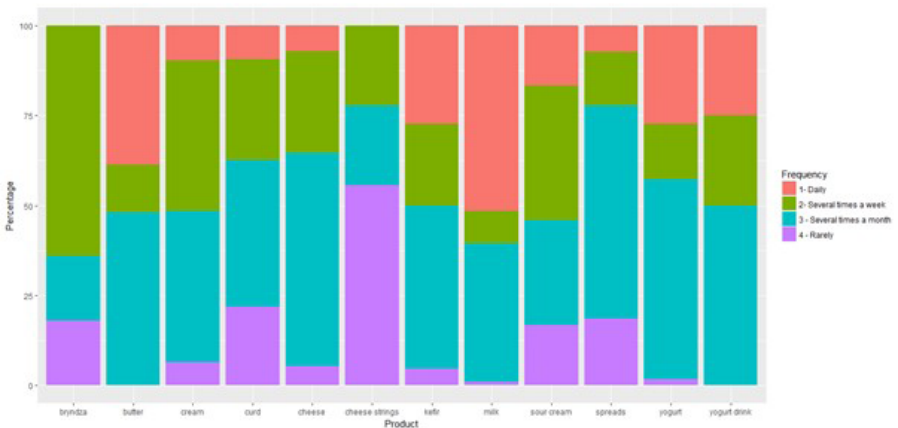
The questionnaire survey showed that most seniors (71%) consume dairy products for breakfast, which can be assumed as based on European habits. 14% of respondents consume the products for supper, 10% as brunch and only 5% for the lunch (Figure 7).

Figure 7 **Consumption time of dairy products**
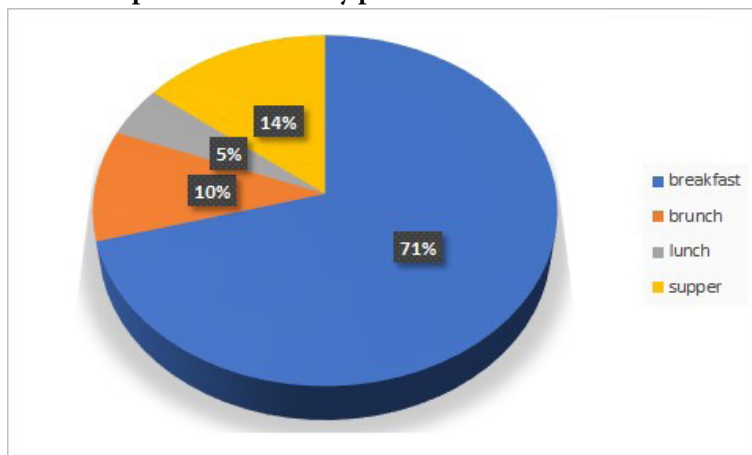
Source: Own processing, 2018.

Seniors are influenced by the number of different factors when choosing a specific dairy product. We found the taste of product (which is evaluated by each consumer) as the most determining for 61,4% of respondents. As can be assumed health aspect is motivational for buying a specific dairy product (39,1%). Despite seniors are considered as the group, which can be simply influenced by various advertisement, their consumer behavior is based on habits (38,1%) in case of dairy products.

Conclusion

Our research of consumer behavior based on questionnaire survey shows that gender is not determining the perception of factors, which influence buying of dairy products. All income groups of seniors spend the same amount of money on a dairy product on average, but the lowest one searches for discounted products. The analogical research focused on the young generation was conducted by Kubelaková & Šugrová (2017). The target group of respondents was between 18 and 25 years. According to their findings, young consumers are also influenced by taste and habits as well as seniors in ours. As can be assumed, the difference

between young and older generation in case of dairy products is based on the perception of health aspects in consumption, which were more important than habits for seniors. On the other hands young do not consider health aspect as determining. Another diversity can be found in preferences for specific products. While young select mainly typical dairy products as yogurt, cheese, milk, seniors prefer milk, sour creams, and yogurt drinks. Mentioned can be the consequence of different daily lifestyle, in addition, which we can assume that seniors use dairy products also for cooking, not only ready-made consumption. Significant perception of the product's origin based on global trends is common for both groups.

Acknowledgements

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SUPPORT OF QUALITY SYSTEMS FOR AGRICULTURAL PRODUCTS AND FOODSTUFFS FROM EUROPEAN FUNDS

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Abstract

The paper's objective is to characterize the selected programs supporting the creation of quality systems and to analyze the use of such programs by agricultural and food enterprises. The key aspect of the operation of the activity "Quality Systems for Agricultural Products and Food Products" is to reduce the manufacturers' shortcomings and the risk of threats to human life and health. The participation of an agricultural producer in a specific quality system increases the added value of the basic agricultural product. The community and domestic food quality systems used in Poland were considered in detail. The paper notes the support for the EU and domestic quality systems as a part of subsidies from EU funds. The desk research method was used. The results were supplemented by the author's own knowledge and experience. The empirical data come from, among else, reports, public statistics documents and the unpublished data from ARMA, a government agency. The market of high quality products was observed to grow, increasingly dynamically, in Poland and in EU states. Organic farming, protected designation of origin and protected geographical indication were found to be the most popular systems within the EU food quality systems. Integrated plant production dominates among the domestic food quality support systems.The presented literature review indicates that competition among food producers has moved to a qualitative sphere. Competing for the consumer based on guaranteed quality of products requires additional financial investment and is much more difficult than just using simple cost-price advantages. Polish producers have to face increasing competition from the foreign producers. Information on food quality systems cause positive development in the food market and enlarge the share of high quality products market.

Keywords: *food quality systems, competitiveness, support, EU funds*

JEL Classification: *R19, D20, O10, G28*

1   Introduction

The social-economic and market conditions under which organizations succeed in the domestic and international markets (EC 2010, EU 2014) are changing dramatically and evolving. Organizations that manufacture, process and trade in agricultural and food products within the increasingly competitive farming and food sector are forced to continue searching for ways of improving their own competitiveness. Pioneering and innovations resulting from the implementation of, among else, process innovations, products innovations, technological innovations or organizational innovations strongly affect the rate and direction of the growth of food production. The market of high quality products, referred to as the market of above-standard products, with confirmed quality, has been developing in Poland and EU states, for several years, in the opposition to the market of mass, conventional products.

The development of food quality systems, where the issue of the quality and safety of food, agricultural products and foodstuffs should be ensured throughout the entire food chain is a challenge that global and EU economies are now facing (Becker & Staus, 2008). To ensure the products are of proper quality, the EU uses extensive and rich legislature to determine the objectives, tasks, systems and conditions for maintaining such quality. Pursuant to the EU directives[4], the main objective of the EU policy is to improve the safety of foodstuffs, to develop uniform legal regulations, to unify the system of food supervision bodies and to improve the efficiency of the supervision system across the entire food chain[5]. The European Food Safety Authority emphasizes that the protection of human health, plants and animals at each stage of the production of food remains a priority for the protection of public health and economy[6]. Among else, the protection should prevent contaminating food, promote food protected with certificates and ensure hygiene during production.

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[4]   Council Regulation (EC) No. 1698/2005 dated September 20, 2005 on support for rural development by the European Agricultural Fund for Rural Development (Official Journal EU L 277 dated 21.10.2005, p. 1-40, as later amended).

[5]   Council Regulation (EC) No. 1234/2007 dated October 22, 2007 establishing a common organization of agricultural markets and on specific provisions for certain agricultural products (Official Journal UE L 299 dated 16.11.2007).

[6]   http://www.efsa.europa.eu/ (accessed on: 12.05.2017).

Regardless of the novelty of the product or the service, the manufacturers should focus on features that are decisive for consumers choosing products. The consumers seek rare, unique values and non-substitutes, care about authenticity and production methods (Goryńska-Goldmann & Gazdecki 2017, Karipidis P., Tselempis D., Tsironis L. K., 2017). Facing the broadly understood needs of the consumers and calling upon cultural heritage, traditions and specificity of various countries, regions and technologies that respect environmental protection, rational use of resources, the well-being of animals and landscape protection within agriculture support programs in individual EU states, the EU emphasizes the importance and essence of food bases on high quality. The clients' requirements constitute an important stimulus for implementing various quality systems that constitute a chance of growth for agricultural producers wishing to reinforce cooperation within the food chain and win their clients' satisfaction and loyalty. Krieger and Schiefer (2004) analyzed the data and concluded that there are over 400 quality systems. The interest in such systems is growing continuously and the producers, processors and distributors are aware of the needs and benefits they enjoy from having them (Kühne et al., 2010, Guerrero et al., 2012, Goryńska-Goldmann & Wojcieszak, 2013, Tarcza, 2015, Svitová & Mráziková, 2016, Dragan 2006). Urbaniak (2012) points that this is an important element among institutional clients (especially international companies who expect their suppliers to provide tools for guaranteeing quality, both from the perspective of the process and the product), and also from the perspective of legal requirements (related to EU directives and regulations) and image effects. Products that have quality card, co-create the areas image in international scale, thus increasing the competitiveness of regions. The connection between the type of the food offered in a region and the development of tourism within this region is also observed (Sznajder, 2017).

The clients' quality requirements are reflected in the product's or service's price (Huber, Bakker, Dijk, Prins, Wiegant, 2012). The purpose of a quality management system is to build trust, so that quality requirements are satisfied and to improve quality through actions aiming to increase the organization's predispositions with regard to fulfilling quality-related expectations. The questions that arises is - what interest do the agricultural and food producers have in food quality systems in Poland? In our domestic reality, the chance for these actions has been opened by the Rural Development Programme perspective 2007-2013 and 2014-2020, within which the available European funds constitute valuable complement to the funding of activities aiming to raise the quality of agricultural products and foodstuffs. The key institution managing the execution of programs providing support for the food economy in Poland, among else the agriculture, agricultural

and food processing and the development of rural areas, stimulating entrepreneurship and the activity of businesses is a government agency, the Agency for Restructuring and Modernization of Agriculture, ARMA, founded in 1994. Being an accredited payment agency, it is responsible for paying out European funds. The paper's objective is to characterize the selected programs supporting the creation of quality systems and to analyze the use of such programs by agricultural and food enterprises.

2 Data and Methods

The paper was written using the desk research method. The authors used the classic analysis of existing and strategic documents which served to establish facts, as well as for verification and presentation. The selection of methods was determined by the availability of source materials, of which some were original in nature and some were secondary (reports, public statistics documents, literature related to food quality systems and the issues of funding entities within the analyzed period). The non-published data made available by ARMA were related to the issues of EU subsidies for food quality systems in Poland, as a part of the Rural Development Programme 2007-2013 and 2014-2020. The presented numerical data come from ARMA's regional branch in Wielkopolska, as per the first six months of 2017, counting from the beginning of budgeting this activity by EU. It is an important aspect that the "Participation of farmers in food quality systems" was aimed at raising the quality of food in the financial perspective 2007-2013 as a part of the Rural Development Program. In the new funding period, namely the Rural Development Programme 2014-2020, it still continues, only with an altered name "Quality Systems for Agricultural Products and Foodstuffs". The subject of the research is the analysis of activity and utilization of EU funds by Polish agricultural producers within the context of food quality systems.

3 Results and Discussion

Speaking of the food quality systems, the EU nomenclature differentiates the so-called community systems operating in all member states and systems that only operate in a given country. The objective of both the community and domestic (national) quality systems is, first of all, to improve the food supply chain, including the processing and introducing to the market of agricultural products and to promote the well-being of animals and to manage the risk in farming. In Poland, the agricultural producers could obtain financial support, as a part of the Rural Development Program 2007-2013, to increase the quality of their agricultural

products and foodstuffs (Goryńska-Goldmann & Wojcieszak, 2013). The range of systems available to farmers within the Rural Development Programme 2014-2020 was expanded (Table 1). The system of "Protected designation of origin and protected geographical indication of wine products" was added to the EU food quality system. The range of domestic quality systems was expanded with the "Quality Assurance for Food Products" (QAFP) system - "Carcasses, elements and meat from chicken, turkey and young Polish oat goose" and the "Quality Assurance for Food Products" (QAFP) system – "Cold cuts".

Table 1 **EU and domestic food quality systems in the Rural Development Programme 2014-2020 perspective**

EU food quality systems	Domestic food quality systems
PROW 2007-2013 and PROW 2014-2020	
Protected Designation of Origin (PDO)	Integrated Plant Production (IPP)
Protected Geographical Designation (PGO)	"Traditional Quality" (TQ)
Guaranteed Traditional Specialties (GTS)	"Quality Meat Program" (QMP)
Ecological Farming System (EFS)	"Pork Quality System" (PQS)
	"Quality Assurance for Food Products" (QAFP) - "Culinary Pork"
PROW 2014-2020	
Protected designation of origin and protected geographical indication of wine products	"Quality Assurance for Food Products" (QAFP) - "Carcasses, elements and meat from chicken, turkey and young Polish oat goose"
	"Quality Assurance for Food Products" (QAFP) – "Cold cuts"

Source: Own work on the basis of http://www.arimr.gov.pl/programy-2002-2013/prow-2007-2013/uczestnictwo-rolnikow-w-systemach-jakosci-zywnosci.html (accessed on 16.01.2018).

The description of the discussed systems is found in the second part of the paper. The Protected Designation of Origin is granted only to products whose unique quality is derived from the place of production, where the production ingredients also come for this particular region (e.g. oscypek [smoked cheese made of salted sheep milk] and bryndza podhalańska [sheep milk cheese] which are connected to the Podhale region and to numerous other elements, among else the breed of the sheep and cows, the method and conditions of pasturing, the quality

and type of milk, cheese production methods, etc.). The Protected Geographical Designation is assigned to products for which at least one manufacturing stage takes place in a given location (e.g. heather honey from Bory Dolnośląskie, made from the pollen of heather growing in Bory Dolnośląskie). The Guaranteed Traditional Specialties is a system that covers products whose traditional character is derived from at least 30 years of history of production. Their ingredients or the production method must be traditional (e.g. old Polish meads - półtorak, dwojniak, trójniak and czworniak). These instruments protect the producers against unfair competition and allow them to promote their products. Ecological Farming (EF) - a sustainable plant and animal production farming system. The EF system should combine environmentally friendly farming practices, support high level of biological diversity, use natural processes and ensure proper well-being of animals. The integrated production system allows obtaining farm produce of the highest biological and nutrient values which are safe to humans. By participating in the IPP system, the producer is obligated to conduct agricultural production on the basis of IPP methodology approved by the Inspection Office for Plant Protection and Seed Production. "Traditional Quality" (TQ) is a renowned domestic food quality system established by the Ministry of Agriculture and Rural Development in 2007 and developed by the Polish Chamber of Regional and Local Products in cooperation with the Association of Regions of the Republic of Poland. The system's objective is to highlight, in the market, products made from natural raw materials, manufactured in a traditional way, including agricultural products, foodstuffs and spirits. The Quality Meat Program (QMP) was considered the national food quality system with the decision of the Ministry of Agriculture and Rural Development in 2008. Related to producing high quality beef. The system was developed by the Polish Association of Beef Cattle Breeders, aiming to produce high quality beef. The Quality Pork Program (QPP) was considered the national food quality system with the decision of the Ministry of Agriculture and Rural Development in 2009. Related to producing high quality pork. The system was developed by the Polish Pig Breeders and Producers Association "POLSUS" and the Polish Meat Association. The quality of pork made in the PQS system comes from the particular obligations resting on breeders, which guarantee that characteristic features are present in the production process, e.g. eliminating or minimizing the impact of stress generating factors pre-slaughter, which could cause irreversible metabolic reactions leading to meat quality defects. The Quality Assurance for Food Products system (QAFP), a domestic food quality system covering pork and poultry. Its goal is to protect Polish breeders along the entire food chain and to work towards consolidating the industry. The

QAFP system covers: (1) fresh poultry and turkey breast, carcasses and elements of young Polish oat goose, (2) fresh pork, (3) cold cuts (poultry, pork and beef). Any producer who is in the following business may apply for a domestic food quality system:

- crop cultivation consisting in minimizing the use of plant protection products so that pests do not cause losses or damage (Regulation 2015)[7];
- manufacturing products using natural raw materials, where such raw materials come from organic farms or farms observing the Good Agricultural Practice and Good Breeding Practice, excluding GMO, and the raw materials used for production must be fully identifiable (Krzyżanowski, 2017);
- manufacturing products according to the specification and standards of the system in which a particular producer participates; for example, in relation to the QAFP system that covers pork, poultry, poultry cold cuts, pork and beef cold cuts, the meat is manufactured by breeders so as to guarantee the characteristic features in the production process, e.g. using only pigs of breeds providing high quality fresh meat that are crossed between two breeds, namely Polish Large White and Polish Landrace (Regulation, 2015);
- products which have a specific feature, or a set of features, that differentiate it from other similar products or products belonging to the same category (Regulation of the Council ... 2015)[8].

With regard to the community quality system, in the case of protected designation of origin and protected geographical indication of wine products, Lipińska (2016) emphasized that an entity whose designation of origin or geographical indication successfully passed the registration process and was awarded a community status of such a product, is authorized to use it. This authorization applies to the entity that requested the protection, obtained it and manufactures wine as per the relevant specification.

Food quality systems are one of the tools allowing to increase the competitive edge of agricultural producers (by integrating them more closely with the farming and food chain, among else) and strategic planning objects. The participation of an agricultural producer in a specific quality system increases the added value

[7] The Regulation of the Ministry of Agriculture and Rural Development dated August 06, 2015 on the detailed conditions and mode granting, payment and reimbursement of financial aid within the submeasure "Support for accessing quality systems" within the Rural Development program for 2014-2020 (Journal of Laws item 1195, and dated 2017 items 1331 and 1662).

[8] The Regulation of the Ministry of Agriculture and Rural Development dated August 6, 2015 on the detailed conditions and mode granting, payment and reimbursement of financial aid within the submeasure "Support for accessing quality systems" within the Rural Development program for 2014-2020 (Journal of Laws item 1195, and dated 2017 items 1331 and 1662).

of the basic agricultural product (on the basis of specific, verified standards that guarantee the product's unique quality) allows to promote them better within a region on a local, national and international level. Producing agricultural products or foodstuffs for human consumption within a specific system is done according to the specification of the final product produced within the system. The quality systems of agricultural products and foodstuffs are of open nature to all producers and cover the binding specifications of products. The compliance with the said specifications is confirmed by public authorities or independent control bodies. The systems are transparent and guarantee full identifiability of products[9].

Given the subject discusses in the paper, the volume of funds that were concentrated and used for activities related to the quality systems of agricultural products and foodstuffs in Poland plays a big role. Within the Rural Development Programme 2007-2013 agricultural producers could participate in measure 123 "The participation of farmers in food quality systems" (report by Agency for Restructuring and Modernization of Agriculture, 2016) in order to improve the quality within the production and agricultural products for consumption, the increase of consumption of high quality food and the support for agricultural producers producing high quality food. The applications could be submitted, on an ongoing basis, from 2009 until 2014. The support for the producers consisted in the payment of funds up to the actually incurred and documented costs for their participation in a given system.

The ARMA report (2016) discloses that 32,279 applications were submitted within the Rural Development Programme 2007-2013, during the first stage (granting the support). Ultimately, 26,752 individuals received the financial support (positive decisions on granting the support). The total pool of funds was PLN 52.1 M (of which PLN 39 M from the European Agricultural Fund for Rural Development [10]; the remaining were public funds from the state's treasury). The analysis of the financial envelope granted in the second stage (payment stage) it was found that over 80% of the beneficiaries received European funds. The payments covered 21,399 producers and amounted to PLN 51.3 M (of which PLN 38.5 M from the European Agricultural Fund for Rural Development). During the execution of the discussed measure, 611 checks were conducted by ARMA in locations where the operation took place. 224 and 12,068 checks and cross

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[9] https://www.minrol.gov.pl (accessed on: 12-02-2018).
[10] the European Agricultural Fund for Rural Development supports the European policy for rural development. To this end, the fund finances programs for the development of rural areas within all EU member states and regions. The programs are developed in cooperation between the European Committee and the member states, taking into account strategic guidelines for the development of rural areas accepted by the Council and the priorities specified in national strategic plans.

controls, respectively, were conducted during the stage of application for the support and the stage of application for the payment. The conducted checks showed discrepancies with regard to the owned documentation, namely lacking certificates of the participation in the specific system, missing invoices for the sold products, missing original invoices or equivalent accounting documents and relevant accounting documents confirming the incurred costs covered with refunds within the measure, incorrectly filled forms of lists of invoices or equivalent accounting documents. The checks failed to identify double funding across all analyzed instances. The analysis of the structure of the products produced by the farmers participating in food quality systems, in increasing order, at the end of 2015, shows that the highest number of measures were done with the group "fruit, vegetables and cereal, fresh and processed" (78.6%), followed by "other foodstuffs" (7.9%), "other animal origin products (including eggs, milk products, excluding butter)" (7.9%), "fresh meat (and offal) (4.8%) and "miscellaneous"[11] (0.8%). In the greatest majority the payments were aimed at agricultural producers for organic production (87.6% of the completed operations) (ARMA Report, 2016). The high interest in this system may be related to the increased ecological awareness among consumers, better accessibility and selection of organic food and the popularization of the sustained consumption idea. Table 2 presents the measure and submeasures related to innovations in improving the products' quality. For the discussed measure, the support limit was determined at EUR 28 B (ARMA report, 2017) versus EUR 13.6 B that makes up the entire financial portfolio of the Rural Development Programme 2014-2020 for Poland.

Table 2 **Areas and ranges of support for projects within the Rural Development Program 2014-2020 within the measure "Quality systems for agricultural products and foodstuffs"**

Area of support	Range of support	Limit of support [PLN]
Quality systems for agricultural products and foodstuffs	Subsidies for new participants of food quality systems	91,706,983.00
	Informational and promotional activities conducted by groups of producers in the domestic market	27,674,310.00
Total		**119,381,293.00**

Source: On the basis of unpublished data of ARMA.

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[11] namely oil and fat, products based on meat (pre-cooked, salted, smoked), cheese, fresh fish, molluscs and crustaceans and products made from them, drinks from plan extracts.

Within the Rural Development Programme 2014-2020, the agricultural producers who produce agricultural products within the community and domestic food quality systems remain the main beneficiaries of the measure "Quality systems of agricultural products and foodstuffs". The support is granted to applicants who produce agricultural products or foodstuffs for human consumption, who had not received this type of support for the same agricultural product or foodstuff within the measure "Participation of farmers in food quality systems" covered with the Rural Development Programme 2007-2013. The farmers benefiting from the measure may be reimbursed a part of the qualified costs of the project (the refund) within 3 years from joining the system. The second area of support applies to subsidizing projects conducted by groups of agricultural producers[12] in the domestic market. The support consists in reimbursing a part of the project's qualified costs. The main goal of this submeasure is the integration with the agricultural and food chain via quality systems, the improvement of the food delivery chain, including the processing of agricultural products and introducing them to the market, the improvement of competitiveness of agricultural products, the promotion of the well-being of animals and risk management in agriculture. As per August 2017, since the beginning of the Rural Development Program 2014-2020, 5,305 agricultural producers submitted applications in Poland within this measure, of which 98.4% received the support. 104 agricultural producers failed to satisfy the procedural requirements, by way of formal deficiencies (e.g. failing to supplement missing documentation within a deadline, outdated certificates of participation in the specific systems). The total amount of financial support granted reached PLN 6,168,448.47, so only 20.03% of the entire financial portfolio within the analyzed measure.

The analyses of the type of the agricultural product produced within the food quality system (Table 1) showed that organic farming, the protected designation of origin and the protected geographical indication were the most popular systems within the EU food quality systems. On the other hand, the integrated plant production dominates among the domestic food quality support systems.

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[12] Support granted to a group of producers as understood in Art. 4 Section 1 of the Commission Delegated Regulation (EU) No. 807/2014 dated March 11, 2014 supplementing Regulation (EU) No. 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and introducing transitional provisions (Official Journal EU L 227 dated 31.07.2014, p. 1 as amended).

Table 3 **The awarded certificates and the type of products produced by agricultural producers within the Rural Development Programme 2014-2020, broken into EU food quality systems and domestic food quality systems.**

Groups	PROW 2014-2020					
	EU food quality systems			Domestic food quality systems		
	PDO and PGO	GTS	Ecological farming (EF)	Integrated plant production	Traditional Quality	Quality Meat Program
Fresh meat (and offal)			66			3
Products produced on the basis of meat (pre-cooked, salted, smoked, etc.)			6			
Cheese					1	
Remaining products of animal origin (eggs, milk products, excluding butter, etc.)	5		105	1		
Oil and fat (butter, margarine, oils, etc.)			25	3		
Fruit, vegetables and cereal, fresh or processed	362		3,804	771		
Drinks from plant extracts			13			
Fresh fish, molluscs and crustaceans and products made from them					1	
Miscellaneous foodstuffs	6		133			
Total	373	0	4,152	775	2	3

Source: Own work on the basis of unpublished data of ARMA (as per August 14, 2017).

The data presented in Table 3 show that "Fruit, vegetables and cereal, fresh or processed" is the most often produced group among agricultural producers within the Ecological Farming system (3,804), followed by "Miscellaneous foodstuffs" (133), "Other products of animal origin" (105) and "Fresh meat and offal" (66). The Ecological Farming system has been continually enjoying the biggest popularity. The ratio of success in receiving subsidies within the EF system topped 94.7%. A similar situation took place in relation to the PDO and PGO systems, however, the scale of the number of issued certificates was over 10 times lower. In this case the fruit, vegetables and cereal, fresh or processed contains products that the producers produce most often in relation to quality systems. The ratio of success in obtaining EN subsidies was 98.02%. An observation can be made when analyzing the domestic food quality systems that the products in "fruit, vegetables and cereal, fresh and processed", within the Integrated Plant Production system are products that are also most often produced by the applicants; the ratio of success in obtaining EU funds is 96.46%. In the case of the Traditional Quality system (cheese production) and the Quality Meat System (meat production) an observation was made that it only applies to isolated cases. No agricultural produces within the GTS (EU) system were produced during the analyzed period.

The participation of an agricultural producer in a specific quality system increases the added value of the basic agricultural product (on the basis of specific, verified, obligatory standards that guarantee the product's unique quality, pertaining, among else, to the production and directing the agricultural products and foodstuffs to the agricultural and food chain) allows to promote them better within a region. The ability to use quality systems significantly raises an entity's chance to compete in the local, domestic or international arena, even more so due to the fact that quality systems are identified by consumers better and better. Aware consumers, with access to high quality foodstuffs, learn about the region and the natural environment, but also about the tradition, culture and technology used for production.

Organizations related to producing, processing and trading in agricultural and food products within the increasingly competitive farming and food sector in Poland are aware of the benefits coming from quality systems. The analyzed systems feature designations that are relatively well identifiable (at domestic level) and are used by numerous meat producers. This may be explained by the five domestic quality systems dedicated to businesses operating in the meat market, which is related to the specific nature of the domestic animal breeding and processing activities and the high number of organizations active in the meat market in Poland.

4   Conclusion

The Polish and EU market of high quality products has been growing increasingly dynamically, after in Poland has become a EU state. It is easy to see the development of tools for strengthening the competitive edge of agricultural producers as the result of using community and domestic (national) quality systems where the issue of quality and safety of food and agricultural and food products should be ensured throughout the entire food chain. The key role in the execution of programs providing support for the food economy in Poland is played by the Agency for Restructuring and Modernization of Agriculture, a government agency.

The issues of community and domestic food quality systems discussed in the publication are confirmed by examples of their use in the markets of high quality food products. The analysis of the agricultural products leads to the conclusion that organic farming, protected designation of origin and protected geographical indication were the most popular systems within the EU food quality systems. However, with regard to the domestic food quality support systems, the integrated plant production system dominated. Due to the low degree of utilization of the limit of support within the Rural Development Programme 2014-2020, changes with regard to the utilization of the support from EU should be examined and monitored. The analyses allowing to identify the motives (including such of financial nature) behind the willingness to participate in the measure / obtain support from the system proved to be an intriguing direction of research.

Entrepreneurs impact the economic development by, applying and getting the subsidies focused on improving food quality. The implementation of quality systems for agricultural and food products can have an impact on the image of the products, it may guarantee their originality and high standards of production process, as well as strengthen the knowledge of the product's origin and characteristics. For these reasons, it is important on the food market to support quality schemes for agricultural products from European funds. These systems contribute to the improvement of food safety and can be used as a valuable marketing tool to increase the competitiveness of food producers and processors.

Topics related to the development of food quality were raised by many authors. Papers discussed such problems are of a general and detailed nature. The presented literature review indicates that competition among food producers has moved to a qualitative sphere. Competing for the consumer based on guaranteed quality of products requires additional financial investment and is much more difficult than just using simple cost-price advantages. Polish producers have to face increasing competition from the foreign producers. Information on food

quality systems cause positive development in the food market and enlarge the share of high quality products market.

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SESSION 2.3
FOOD MARKETING AND CONSUMER STUDIES- SESSION ORGANIZED WITHIN THE PROJECT KEGA 038SPU-4/2016 "IMPLEMENTATION OF NEW TECHNOLOGIES AND INTERDISCIPLINARY RELATIONSHIPS IN A PRACTICAL EDUCATION OF CONSUMER STUDIES"

VIRAL MARKETING AS UNCONVENTIONAL FORM OF ADDRESSING CONSUMERS

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Abstract

Nowadays classic forms of propagation, including television and printed advertising, are being replaced by new marketing tools. Presentation of products and services on the Internet has become one of the most significant trends. Moreover, the form of presenting advert to consumers has changed as well. Companies are not only trying to expose consumers to their adverts, but they also make a great effort and spend a lot of money on creating campaigns which are interesting enough for consumers to share them with their friends and family. Consumers, who were only passive recipients of advertising in the past, have become active in sharing campaigns, thereby a new form of marketing called viral marketing has been invented. The main aim of this paper is to evaluate whether consumers perceive viral marketing as a form of promotion of products and services and whether they spread viral messages on the Internet. Primary information was obtained by questionnaire survey and processed by Chi-square test for independence and Cramer´s V. Based on the results almost 30% of respondents actively share viral advertisement on social media (especially Facebook) or by e-mail and 74% had never heard of viral marketing or have heard about it but do not know its meaning.

Keywords: *viral marketing, viral message, viral advertisement, consumer*

JEL Classification: *M31, M37, M39*

1   Introduction

The free movement of goods in the process of globalization and a significant expansion of the Internet have caused the escalation of competition for consumers. Therefore, entrepreneurs are trying to get many innovations to their consumers (Kubelaková, Nagyová and Košičiarová, 2015). Everyday consumer purchase decisions are made influenced by marketing stimuli. (Kubicová, Kádeková and Rovný, 2012). Currently, is the competitiveness of enterprises increasingly based on ability to adapt to customer requirements. (Ubrežiová, Kapsdorferová and Košičiarová, 2012). Customers are gradually getting more demanding for processing of non-typical marketing campaigns and they are much more negative to the classical form of advertising. Marketers draw their attention to new alternative forms of promotion. Their benefits lie mainly in the fact that they are original, offbeat, funny or shocking, and based on the element of surprise. (Holienčinová, 2013). Modern marketing tools are in comparison with traditional more effective and relatively cheaper (Nagyová et al., 2014). The effective use of alternative marketing practices can be especially advantageous for smaller to medium sized firms in the consumer products and services industry, which oftentimes lack the resources that are necessary for employing traditional forms of advertising. Cost-effective promotional options that can also deliver measurable business results can be achieves through a social media platform, guerilla, events-based marketing and moreover viral marketing (Castronovo and Huang, 2012).

The term viral marketing is credited to venture capitalists Juverton and Draper, 1997 who used viral to describe the marketing techniques behind The Hotmail adoption pattern as a virus- with spatial and network locality. People typically send e-mails to their associates and friends; many of them are geographically close, and others are scattered around with clusters in areas of high Internet connectivity. The beauty of it is that none of this required any marketing dollars. Customers do the selling. The catalyst for success was the promotional tag on each outgoing email, which turned subscribers into company salespeople who took the message to their own word-of-mouth networks. Thus, the viral message spread organically with spatial and network locality, much like a virus, and garnered 12 million subscribers in 18 months for less than $500 000. Since then, viral campaigns have become increasingly popular (Ivanov, 2012).

1.1   Viral marketing

Through a set of reasonable and effective points viral marketing system guide and encourage customers to initiate publicity (Jianliang, 2012), so we can define it as any strategy that encourages individuals to pass on a marketing message to

others, creating the potential for exponential growth in the message's exposure and influence. Like viruses, such strategies take advantage of rapid multiplication to explode the message to thousands, to millions (Wilson, 2005). Information proliferates across a million people rapidly (Figure 1) within a short period of time. Marketers are now increasingly looking forward to tap this opportunity to deliver any type of a marketing message because of its ability to make the message contagious (Haryani and Motwani, 2016).

Figure 1 **Spreading of viral message**
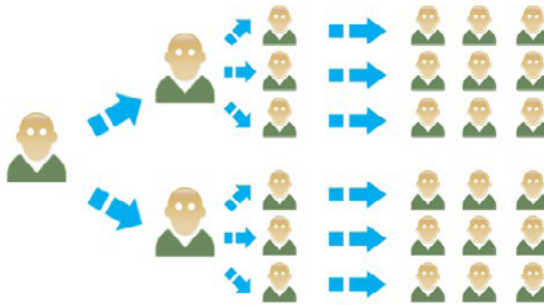
 Source: Triad, 2010.

By creating their own online social networks, social media marketers can influence a brand community and potentially influence consumer behaviour (Miller and Lammas, 2010). The main functions of all these platforms are to interact with each other and to share the information (Ahmad, Musa and Harun, 2016). Viral marketing uses social networks to promote goods or services through spreading texts, videos, images. Existing social networks in which people share information on products or services are used for this purpose (Šramová, 2014). Using of viral marketing can integrate any social networking sites like Facebook, Twitter or Instagram into one operation system (Fadil, 2014). We can not forget that the viral spread of information through social media has a much greater ability to reach audiences that other media such as TV advertising, radio and print (Keller, 2009). There are three main reasons why marketers include viral marketing in the company's marketing mix.

- It incurs very little expense since the individual passing on the referral carries the cost of forwarding the brand message.
- Those forwarding the message will be more likely to know which of their friends, family members and work colleagues have similar interests and are thus more likely to read the message.

- Unlike traditional advertising viral is not an interruptive technique. Instead, viral campaigns work the Internet to deliver exposure via peer-to-peer endorsement (Hollensen, 2008). Many consumers perceive traditional forms of advertising as an undesirable part of everyday life, which often does not respect the moment intimacy (Ábelová, Kádeková, 2011).

The main disadvantage is that this is a high-risk marketing communications technique, since it requires significant investment in the viral agent and seeding. However, there is no guarantee that the campaign will „go viral" in which case the investment will be wasted (Chaffey, 2009) Although this technique entails insubstantial media costs, there are other costs in the initial set up of e-viral campaigns. One of these costs is in the research needed to identify suitable „seeds" or opinion leaders, to understand their preferences and contacts and to gain their permission to send them the viral message (Masterman and Wood, 2007). Once a message spreads as a virus over the Web, it is impossible to further control this process. In addition, because consumer is free to forward any message, it is difficult to control what message consumers are writing on their peers (Wuyts et al., 2011).

2   Material and methodology

The main aim of this paper was to evaluate whether consumers perceive viral marketing as a form of promotion of products and services and whether they spread viral messages on the Internet.

Firstly, the secondary information, including the literature of domestic and foreign authors, Internet resources and publicly available information, served as a foundation for the theoretical part of this paper. Additionally, primary information obtained from a conducted survey was used to compare the theoretical knowledge with information from consumers.

All respondents answered 19 questions, which were divided into two main parts. The first part consisted of 3 questions about gender, age group and highest level of education completed by the respondent. In the second part, there were 16 questions with closed or semi-closed character for easier processing of primary information and quicker filling in the questionnaire form by respondents. The main purpose of the questionnaire survey was to find out if people know the term "viral marketing", how often they use Internet and to assess whether they share viral messages with their friends and family members. This paper provide evaluation of key questions of this survey.

To preserve the representativeness of the survey, subjects of questionnaire were inhabitants of Slovak Republic of all age categories respecting the last consensus

of population. The questionnaire survey was completed by 427 respondents, out of whom 232 were women and 195 were men (Figure 2). The questionnaire was sent by e-mail and Facebook to respondents during the month of December 2017. Google Forms, an online survey tool, was used to sort data into an Excel sheet. Older people received the same questionnaire in papier form which were eventually transformed into digital form.

Figure 2 **Gender and age group of respondents**

	Men	Women	Total
To 19 years old	36	43	79
From 20 to 39 years old	63	95	158
From 40 to 59 years old	53	51	104
Over 60 years old	43	43	86
Total	195	232	427

Source: Own processing according to the questionnaire survey.

First of all, questionnaires with incorrectly answered or unfilled questions were discarded. Then, all questions were evaluated graphically and verbally by using deduction. Moreover, we used methods of qualitative statistics. We tested representativeness of the sample by Chi-square goodness of fit test and used Chi-square test for independence to support or reject the null and alternative hypothesis formulated based on the following assumptions:

Assumption 1: Younger respondents (up to 39 years old) prefer new forms of advertising products and services and people older than 40 years of age prefer traditional forms of advertisement.

Assumption 2: Respondents younger than 40 years old share viral campaigns with their friends and family members and older ones do not.

Assumption 3: More women than men think that viral marketing is suitable for promotion of food.

Assumption 4: Especially the age category from 20 to 39 years old would welcome using viral marketing by Slovak entrepreneurs.

3   Results and discussion

The first question was focused on the preferred form of advertisement (Figure 3). Majority (62.76%) filled in the option traditional forms of advertisement. These traditional forms, such as TV spots or radio spots, are being slowly replaced by new forms of advertising, which were preferred by 37.24 %. This indicates that

mostly young people realize that companies are trying to innovate and reach potential customers in new, more original and interactive ways.

Figure 3 **Preferred form of advertisement by respondent**
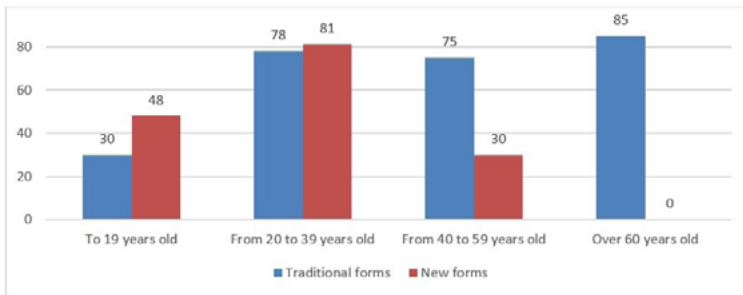
Source: Own processing according to the questionnaire survey.

For this question of the questionnaire the first set of hypotheses was developed. They studied whether the respondent's age influences preferred form of advertisement. Determined hypotheses were tested by Chi-square test for independence. At significance level of 5% we rejected hypotheses H_0. The assumption that there could be a dependency between age categories and preferred form of advertisement had been confirmed because the critical value (7.81) was smaller than the test statistics (84.77). Since an alternative hypothesis was confirmed, we also calculated the Cramer´s V, which showed the force of dependence. Value of this coefficient was 0.46, so association between variables was quite significant.

The term "viral marketing" was the object of the second question. Up to 52% answered the question that they had never heard of viral marketing, and 22% of respondents had heard the term but did not know what it means. The fact that majority did not know that such a concept exists or did not recognize its meaning can be explained by the fact that viral marketing is a relatively new concept. The first Slovak viral campaign appeared in the Slovak Republic in 2007 when people sent more than 1 million Christmas wishes in the form of video provided by beverage brand Kofola (2018). Only 26% of the respondents answered they knew the term and its meaning.

The third question was open. Respondents could use their own words to describe what they think that the term "viral marketing" meant. The most accurate answers described "viral marketing" as follows:
- marketing that is based on the fact that the consumer spreads the advertisement further because he wants,
- the activity in which the recipient becomes the message distributor,

- ■ a modern method that uses traditional online advertising formats and empha-sizes fun and eye-catching content which increases consumers´ willingness to distribute it among themselves,
- ■ the advertisement that customers spread among themselves.

The largest number of people had mistaken the word "viral" with the word "virtual", so they described viral marketing as promotion of goods on the Internet. Partly they were right, but they did not fully describe the character of viral marketing. One respondent thought that viral marketing is a marketing that deceives and interrupts consumers. Some of the respondents did not know what the word "marketing" means.

More than 70% of respondents said that they do not spread viral advertise-ment campaigns (Figure 4). The other 28% of respondents (120) admitted to spread them. Similarly, in research of Poorvika and Kavtha (2014) 33% of the total respondents spread the messages to share interesting and fun contents. Interest-ingly, in our research, 36 of these respondents were older than 40 years. Thus, we can claim that the trend of changing consumers from passive recipients to active spreaders is gradually starting to reflect on older generation, too.

Figure 4 **The fact whether the respondent share viral campaigns**
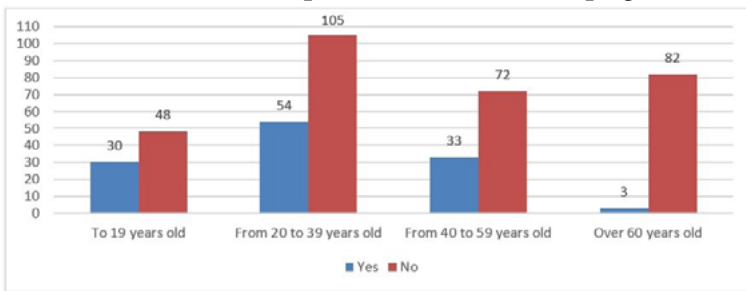
Source: Own processing according to the questionnaire survey.

Chi-square test for independence was also used to test answers of this ques-tion. Based on the results, there was dependence between the age and whether the respondent spread viral campaigns. The value of the test statistics (30.99) was more than the critical value (7.81). This means that companies should use viral marketing especially when they target the young people segment. The coefficient of the association with value 0.27 had also confirmed existing dependence.

It does not matter if company publishes video or picture because consumers voted equally in favour of both. So, the form of message is not as important as its content.

In the next question, we tried to find out which advertisements are interesting to respondent so he decides to send them to another person. 51.67% of those who spread viral campaigns were most likely to share campaigns with original content and 16.66% shared emotional campaigns. This fact was confirmed by Wharton professor Jonah Berger because findings from his earlier paper show that people tend to share unique content that evokes a strong emotional reaction (Ciotti, 2013). Perhaps the main reason why companies are trying to come to the market with the most unpredictable advertisement. All other options (campaigns with sexual content, that show famous celebrities, promote discounts and category "other") were marked by approximately 10 people.

In regards to the previous question questionnaire also asked about media which is being used by consumers to share viral campaigns. 74.19% has chosen Facebook. This can be explained by the fact that Facebook is the ideal tool for spreading images, videos, written text and links to the specific web sites just by clicking the "share" button. In Chu´s (2011) research youth have favourable attitudes toward advertising delivered through social media especially Facebook. Thus, social media are a potentially rich avenue for viral advertising campaigns. E-mail was chosen by 20.82% respondents. Majority of them were between 40 to 59 years old. This age category does not use social networks daily, so the advertisements that interest them are being spread in such an outdated way. The options "other" was marked by 4 respondents and the option Twitter by 2 people.

44.96% of respondents identified low costs for spreading the message as the biggest advantage of viral marketing. Consumers understand that it is beneficial for companies to release a message that is interesting enough that their recipients decide to spread it further. Almost 30% of the respondents thought that a viral campaign can get to the target group easier because people tend to share the campaign to individuals who have similar interests. This fact was confirmed by research where 71% of respondents said they would prefer ads that are tailored to their personalized interests and shopping habits (Pauzer, 2016). 27% of respondents, who were particularly in a higher age category, indicated the benefit of not using interruptive technique which would be disturbing.

According to 63.47% respondents, the biggest disadvantage of viral marketing was the fact that the message does not have to be interesting enough. Consumers know that when a campaign is unattractive, people do not decide to share it and the message does not become viral. 21.07% identified uncontrollability of the message as the major disadvantage. Some people (15.46%) were aware that a large budget is often needed to create pompous advertisement.

Moreover, when it comes to assortment groups, this research pointed out that viral marketing is also suitable for propagation of food products. Although

originally viral marketing was used for promoting music releases and fashion, now, it is commonly used with food products. 74.00% of respondents thought that promotion in television or printed media is not enough and even food producers should adapt to the newest trends.

We were interested in whether women thought that viral campaigns are suitable for advertising food products as well as men. To support or reject H_0 hypotheses we used Chi-square test for independence. In this case, the zero hypothesis was also rejected, because the critical value (3.84) was less than the test statistics (4.89). From the results of Cramer´s V (0.11) we can claim that at significance level of 5% the dependence between variable was low.

We also asked whether respondents would prefer Slovak companies using viral marketing as a form of promotion of their products and services. A minority with 32.08% answered this question negatively. There are still some customers (especially elders) who prefer simple advertisements which show them just how the product looks and works. Larger group (67.92%) would welcome using viral marketing by Slovak entrepreneurs because they are more imaginative, funny and catch their attention quickly. Almost the same percentage of respondents saw the future of advertisement in viral marketing (Figure 5).

Figure 5 **The fact, whether the respondent see the future of advertisement in viral marketing**
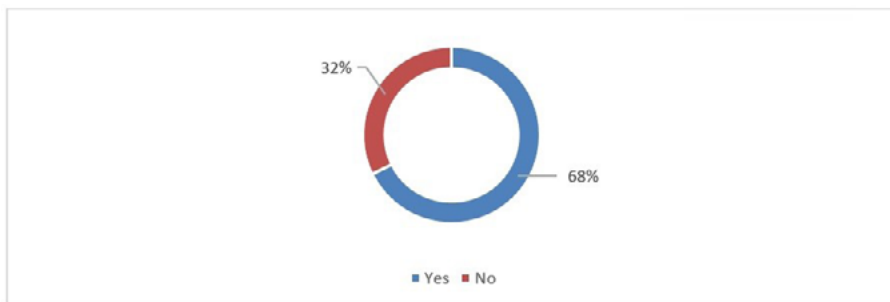
Source: Own processing according to the questionnaire survey.

For the purpose of seeing future of Slovak advertisement in viral marketing, additional hypothesis were established. The main goal was to determine whether there was a difference between age groups. Our calculations showed that the test statistics (23.41) was higher than the critical value (7.81), so we accepted an alternative H_1 hypothesis. Existing difference between respondents of different age was confirmed by Cramer´s V (0.23).

4 Conclusion

The research confirmed that, nowadays, particularly younger generation spends lots of time online. They use social media on daily basis which is the reason why enterpreneurs try to attract potential consumers by using new form of advertising called viral marketing- when consumers find viral campaings attractive enough to share them with other people.

Interestingly, more than a half of respondents in our research had never heard of viral marketing and, moreover, another 22% had heard about it but did not know its meaning. We can conlude that many respondents do not know that viral marketing is a form of promotion of products and services, even though some of them (28.10% of the sample) actively support spreading viral messages, when they share them on social media (especially Facebook) or send them by e-mail.

Respondents share content in the form of video as often as in the form of picture. Therefore, the unique content and emotional stimuli are more important. When it comes to the promoted product, 74.00% of consumers would like to see viral campaigns of food products not only for electronics, clothing or cosmetics.

44.96% of respondents identified low costs of spreading the message as the biggest benefit of viral marketing. But it has other advantages like targeting chosen segment faster or not using interrupting technique as well. Even though viral marketing has some disadvantages, too. 67.92% of respondents would prefer Slovak entrepreneurs using viral marketing to promote their products. 67.68% see the future of advertising in more unconventional forms such as viral marketing.

Based on the survey, we recommend using promotion on the Internet and social media by companies because it positively influences consumer behavior, it creates an illusion of company that uses new technologies and follows the newest trends. Furthermore, when an campaign is interesting enough it can become viral and target masses with relatively low distribution costs.

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AROMA MARKETING - A MODERN MARKETING PHENOMENON

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Abstract

The smell has an advantage over other senses, because it is directly linked to the limbic system in the brain and immediately stimulates the human emotions. By using of fragrances, it is possible to comprise a connection with the customers at a deeper emotional level, which will bring them a memorable experience. The odor can attract new customers, increase the perceived value of goods and services, as well as increase the brand awareness and overall customer satisfaction. In a world overcrowded with advertising and visual overload, traditional marketing tools are becoming less effective. Thus, the current trend is communication simultaneously oriented on several human senses, which is represented by a modern phenomenon called aroma marketing. The paper deals the interdisciplinary research of selected aromas in laboratory conditions and their subsequent monitoring in real conditions in the chosen travel agency AVOCADO, where we´ve aromatized the place premises and thus we´ve influenced the purchasing behavior of clients. We examined this effect by observing the sales of tours in the months when the aroma was applied compared to months when any aroma was placed. Based on observations in real conditions, we have been able to demonstrate the influence of odor on the sale of tours/ trips.

Key words: *Aromacology, Emotions, Face reader, Smell, Travel agency*

JEL Classification: *M31, M39, M81*

1   Introduction

Nowadays, there is a field of visual merchandising and in-store communication relatively discussed topic in the sphere of marketing. The environment of business and services constantly requires the changes that contribute to increased sales and customer satisfaction Berčík et al. (2016). The media are increasingly appealing to the importance of communication at the point of sale, and their claims are supported by studies conducted mainly abroad. Securing the convenience of the buyer is becoming more and more challenging, and because the retailers are constantly trying to make use of new technologies and provide to customers not only satisfy their needs but also to keep a shopping experience.

1.1   Visual Merchandising

The increasing of competition in the trade and service sector has forced the sellers to differentiate themselves from others and at this time the visual merchandising comes as a differential advantage of the company Holienčinová (2013). Visual merchandisers are responsible for the overall presentation of goods and services, creating a final corporate image, and are also involved in the placement of design elements in the retail space Pradhan (2009). Visual merchandising is a tool to achieve the sale goals, a mechanism of communication with customer, a set of elements, which all influence the customer decision and they are a tool of creative and efficient customer ʻeducation about the product. Itʼs all, what a customer see in exterior, interior of store, service provider and itʼs made by positive image of a company (Bhalla & Annurag, 2010).Most people nowadays only donʼt perceive a shopping as a matter of meeting primary needs, but also as the possibility of spending leisure time Paluchová, Berčík and Neomániová (2016). People who come to the shops or service providers are often affected by the problems of everyday life and are expecting some positive distraction from shopping. The emotions directly at the point of sale should contribute to making the experiences, not only to satisfaction of needs with a product/ service Vysekalová et al. (2014);Horská et al. (2014). Visual merchandising brings to the sphere of trade and service various theater cues (show elements), which make the shopping funnier and leading the customers to the store research Púchlo (2015).

1.2   Atmosphere of Store Spaces

There are several ways, how to distinguish from the competition. One of the most used ones is to offer original goods, respectively service. To the foreground is coming, storeʼs efforts to raise their overall atmosphere to the customerʼs prolonged

stay or the influence of his/her purchasing decision. The atmosphere of the sales area is a summary of all elements that make the customer feel comfortable about visiting the store or specific space. Paluchová, Berčík and Neomaniová (2016) appeal to the fact that, if the retailer and service provider would be currently successful in the business sphere, they need to improve their products and services, offer them the required quality at reasonable prices and provide the buyer an unforgettable atmosphere. Pelsmecker et al. (2007)understand under the term of store atmosphere, an effort to provide the condition, that provoke to consumer the unforgettable emotional effect and thus the probability of buying a particular product will be increased in a store. The Figure 1 illustrates the impact of store atmosphere in a store from the first - emotions (e.g. happiness), cross the characteristics of each space, such as music, light etc., to the last one - the consumer behavior represented by spent time, willingness to shop.

Figure 1 **Influence of Store Atmosphere on Consumer Behavior**

Source: Pelsmacker et al., 2007.

1.3   Design of Store Space

According to Vorela (2016) design plays an important role in communication with the customer, contributes to a better perception of the space and increases the time spent in the store. Design is an important part of the business strategy and in many cases is a competitive advantage (Kubicová & Kádeková, 2017). Revitalization of the premises is carried out in cycles of three to five years. Kita (2013) presents two main attributes, which should be required for store design: operability and functionality.

1.4   In-Store Communication and Its Importance in Food Stores

Nowadays, people are very easily influenced. Even a small impulse can change the purchase decision that had previously thought. In-store communication offers a whole range of solutions that drive people to mindless purchases and they provide for sellers the growing of revenue (Šajbidorová & Lušňák, 2009). Boček, Jesenský

and Krofianová (2009) present, that in-store communication is a set of advertising applied inside of the point of sale, of service providers and are intended to influence the customer´s purchasing decision. Vysekalová et al. (2014) used for the description of in-store communication 'functions, the EIEP model, which is based on four levels of effects:

a) *exposure:* to encourage on customer to spot it at the point of sale and understand what the seller wants with the in-store communication tell him/her, what brand is communicated and what category and so on.

b) *interruption:* disturbing the customer from his shopping routine with various functional or emotional impulses that ensure the interaction between him/her and the POP medium, respectively supported by product/service.

c) *engagement:* aroused of interest for buying the product, explaining why it´s good to buy the product/service.

d) *purchase:* to motivate to buy each product/service.

As Šugrová et al. (2017) present, quality of products and services may be considered as a significant factor that contributes to creating a strong brand, or even a strong corporate business. In-store communication is a way to ensure the loyal and satisfied customers at the point of sale.

1.5 Short Explanation of Aroma Marketing

Nearly 75 % of the feelings which are experienced during the day are regulated by fragrances. The aroma directly influences the limbic system, which controls the feelings and memory sections in the brain. The odors have an emotional importance for humans, on average, man can recognize up to 10,000 fragrances, and 65 % of the fragrances which he/she already felt in the past are kept in the brain for up to one year Erenkol (2015). The smell perception is a subjective affair involving many other factors, such as culture or individual preferences. The impact of cultural aspects can be characterized by the type of preferred fragrances. In the USA, the sweet smells are preferred, such as vanilla, cinnamon, while in Finland, the fragrance of berries or coffee. And because, the most important is to find out those aroma, that will reach as many potential customers as possible Virkkunen (2015).At a time when the term "shopping experience" comes to the forefront, aroma marketing is a phenomenon that is experiencing a renaissance and becomes an essential part of in-store communication Sikela (2015).We can talk about a new generation of in-store communication tools to measure a consumer impact, a customer targeted influence and an interactivity. The current customer could be identified as a demanding, hedonist, unstable and individualist. The place of sale is an area, where he/she is looking for the new experiences, feelings

and emotions. In order to satisfy these requirements, tools of sensory marketing are used today. These tools are also a medium of comfort, an exceptional atmosphere that can extend the customer´s stay in a store, in service company up to 30 % Labská (2009).According to Sikela (2015) sellers and service providers are aware of the human subconscious´ influence on the consumer behavior during the purchase and for this reason they combine external impacts attracted on all human senses. As Pajonk & Plevová (2015)present,scent marketing includes a series of events where it is possible through the scent to stimulate visitors in the shops to purchase and the employees to a higher workload. Tarczydlo (2014) understands under the aroma marketing an art the use of scent in marketing campaigns, evoking the consumer´s desired emotions and convincing him/her for the correctness of buying the product/service. Aroma marketing strongly influences the customer behavior at the point of sale through carefully selected fragrances. Paluchová, Berčík and Neomániová (2016) wrote, that the pleasant smell released into the air keeps the buyer longer in the sales area, positively affects his/her desire for the product/service and at the same time increases his/her willingness to pay more money.

2   Data and Methods

The main purpose of the submitted contribution is to point the modern marketing phenomenon - aroma marketing. The research was conducted in the AVOCADO travel agency during one month in 2017 by placing of a flavoring unit. The application of the selected aroma was preceded by consultation with the owner of the travel agency and subsequent testing under laboratory conditions. After selecting two specific aromatic compounds *"North Sea"* and *"Apple"* by the owner and employees, was conducted a subconscious perception test by using of biometric somatic face recognition method FaceReader in the laboratory conditions.

For data collection were used:
- *observation method using Microsoft Webcam*: LifeCam Studio with 1080p HD Sensor, which captured expressions of respondents´ faces,
- *questionnaires surveys:* two; one conducted in the laboratory conditions on the participants and the second directly in AVOCADO travel agency on clients.

For data processing were used:
- *facial expressions analysis based on basic emotions:* surprise, fear, joy, sadness, disgust using FaceReader 6.1 from Noldus company,

- *contingency tables*: for better analysis and processing of graphical form of results from both questionnaires and calculation of average from the area of descriptive statistics.

Formula to calculate arithmetic mean - simple form (Matejková et al., 2013) is described in the following example:

where: x_i - i-th value of the statistical file,
    n - range of the statistical file.

For a travel agency of approximately 40 square meters we have chosen a suitable flavor unit, namely Aroma Streamer 650. This model works automatically by setting the timer. It is therefore necessary to be permanently connected to electricity. It guarantees immediate conversion to the gaseous state from the liquid and thus guarantees a long-lasting effect. The model is powered with 12V and 10 Watts of power, covering up to 100 square meters of aroma spraying. The dimensions of this model are 210x230x62 mm.

Figure 2 **Aroma Streamer 650 Flavor Unit and Refill**

Source: Authors´ own processing.

The timing of flavor unit was switched in the travel agency AVOCADO every working day, from Monday to Friday, in two intervals. This survey was realized from January 10 to February 10, 2017. During this month, revenues and number of sold tours in individual categories were monitored and then compared with the previous period and months. At the same time, all customers were asked to fill out a short questionnaire to find out their conscious preferences.

3   Results and Discussion

The research of two aromatic compounds was performed with 27 respondents (56 % women, and 44 % men) done in laboratory conditions, who in advance agreed that their data could be processed for research 'evaluation of data. Each respondent got two samples of aromas, identified by numbers 1 and 2, so he/she was not able to identified, what sample is 1 and 2 and they were not influenced. In addition to the samples, respondents answered on questionnaire towards to fragrances. Respondents´ reactions were recorded by the Face Reader analytical tool, which immediately recognized the subconscious emotions of the respondents (Figure 3). From our survey, for the AVOCADO travel agency will be more appropriate to apply the smell of *"North Sea"*.

Figure 3 **Detection of Micro Emotions Using Software Face Reader 6**
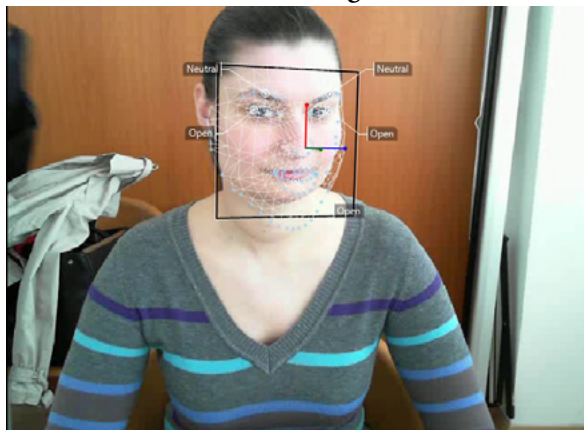
Source: Authors´ own processing.

From the questionnaire survey (Figure 4), we found out that 52 % of the respondents considered the most interesting sample of the *"North Sea"* fragrance, which was later applied in interior of travel agency AVOCADO. The reason may be the fact that the majority of women (most of the sample) associate the smell of *"Apple"* with a scent typical for the toilets.

Figure 4 **The Most Positively Perceived Scents by Respondents**

Fragrance no. 1   Fragrance no. 2
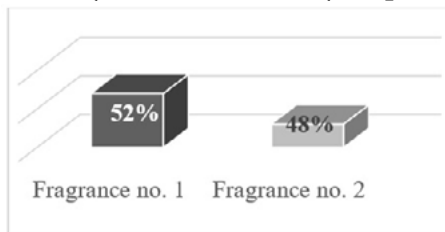
Source: Authors´ own processing.

Sample no. 1 *"North Sea"* we also chose because of the average mood´ values, which we obtained from the Face Reader device. Respondents were happier by sample no. 1 and sadder by sample no. 2. Since the happiness and sadness are the basic emotions of human, these values have been indicative for us. In Table 1 we highlighted grey them.

Table 1 **Percentage of Respondents 'Moods for Both Fragrances Based on Face Reader**

Moods	Fragrance no. 1 (%)	Fragrance no. 2 (%)
Happy	17.76	12.15
Sad	12.98	15.39
Angry	8.28	7.87
Neutral	47.38	49.28
Other	6.00	11.81
Surprised	2.40	0.41
Disgusted	3.35	2.67
Terrified	1.06	1.21

Source: Authors´ own processing.

The effect of the place aromatization on the shopping decision making in AVO-CADO travel agency was mainly observed during the month when the aromatization was placed and we compared it with the months without aromatization. In Table 2, we can see three columns that represent three periods, when AVOCADO was flavored and when not. The first column represents four categories of tours/ kinds of holidays. The second column indicates the period before aromatization. The grey column represents the number of tours sold during the aromatization of its agency. The fourth column illustrates the period after the aromatization. From

the values in the table, we can determine that the "First Moment" holiday, then the "Excursion tour and Exotic" as well as were the best sold during the aromatization period. It follows that the aromatization has an effect on consumer behavior, the number of sold tours are less than. Also, we compared the data with a last year 2016, and we support the fact that the increase of tours was higher in 21 % between January, 10th 2016 - February, 10th 2016. Except aromatization, we summary also other factors, which influence the clients buying the holidays/ tours:

- "First Moment" are price preferable tours,
- if a holiday/ tour is bought in winter season, then it is usually cheaper than when it is bought after the start of the season - on May.

Table 2 **Overview of Sold Tours in Chosen Months**

Category of tours	No. of sold tours on December, 10th 2016 - January, 10th 2017	No. of sold tours on January, 10th 2017 - February, 10th 2017	No. of sold tours on February, 10th 2017 - March, 10th 2017
First Moment	12	18	15
Exotic	6	8	7
1-day	18	6	3
Excursions	3	7	4

Source: Authors´ own processing.

Except of these two factors, that are repeated year-by-year, we are supposed, we can say that when we compare two months - before and after aromatization, the month when we flavored the agency was the most successful. This result partly confirms the impact of the new trend in marketing communication in tourism too. We are able to demonstrate, that the new trend - aroma marketing has an impact on consumer behavior in the service segment, namely in the travel agency. The highest profits of the agency are in category "Exotic" and "First Moment". When we compare these two categories with previous months, there is a clear increase in turnover in this month, when we placed the aromatization (Table 3).

Table 3 **No. of Sold Tours in a Category „First Moment and „Excursion Tours "**

Period	First Moment	Excursion Tours
Month before	12	3
Month during	18	7
Month after	15	4

Period	First Moment	Excursion Tours
Together	45	14

Source: Authors´ own processing.

In our questionnaire survey, we directly in an agency asked two questions (see Figure 5). First one: „How do you evaluate the interior environment of travel agency AVOCADO? And second question: „ Is the aroma in an agency pleasant for you?

Figure 5 **Results of Questionnaire Survey in an Agency**
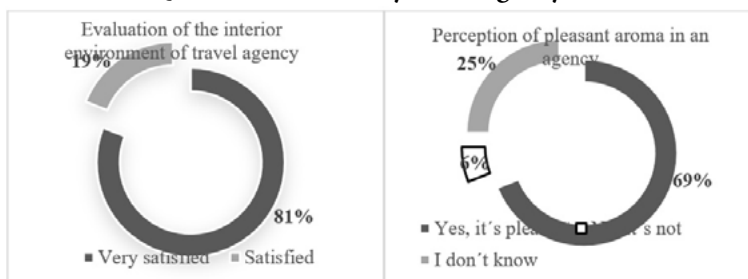
Source: Authors´ own processing.

Conclusion

On the basis of the obtained results, we propose for the travel agencies an investment in the aromatization devices despite the higher costs. But on the other side, can be expected the high return of cost after the first month. It was confirmed in our experiment, when the most tours were sold in the period of space aromatization (category of First Moment). In our chosen agency, we tested *"North Sea"* fragrance in the following of this research, we partially proved the impact on the sale of tours. From an economic point of view, it should be noted that the aromatization device is financially demanding because such devices range cost about 400 - 900 €, depending on the particular type of appliance and the flavor itself about 40 € per month depending on its size. These tours are profitable for companies because they are total sold, and it is also possible to assume a relatively high return on the costs of more efficient marketing at the point of sale in the form of aromatization. In conclusion, the aromatization in this service segment is justified by the fact that it has at least a slight impact on consumer behavior. Consequently, the experiment has its limitations, so we plan to perform similar research activity

in other months. We also want to focus on factors of air quality and different intensity of aroma by the use of other types of aromatic compounds.

Acknowledgements

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PRODUCT CATEGORY, PRODUCT FEATURES AND CONSUMER ETHNOCENTRISM

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Abstract

The aim of the paper is to identify consumers' ethnocentrism symptoms based on declared importance of product's country of origin as a buying factor of food market and perception of selected product's features in relation to its country of origin. Paper was prepared on a basis of the primary materials from a face to face questionnaire survey, in total 423 interviews were qualified to the analysis. The respondents were the individuals responsible for supplying households with food products. The interviews were carried out in selected locations in north-western Poland. The country of origin may be an important buying factor of food products for Polish consumers. The importance of this factor is linked to the product category. Consumers pay more attention to the product's country of origin in terms of fresh and low-processed food products, while this factor is less important toward highly processed food products. There are differences related to the country of origin in terms of food products' image. Local products are perceived as e.g. more healthy, traditional, tasty. These characteristics are related to the product itself and may result from the production process or the ingredients used. The advantages of foreign products are associated to the marketing activity of enterprises, e.g. factors "easy to recognize", "innovative and attractive packaging".

Keywords: *food market, consumer attitudes, country of origin, consumer ethnocentrism*

JEL Classification: *D12, M31, Q13*

1   Introduction

The aim of the paper is to identify consumers ethnocentrism symptoms based on declared importance of product's country of origin as a buying factor of food market and perception of selected product's features in relation to its country of origin.

The importance of product's country of origin in consumer choices is connected with the term of consumer ethnocentrism. It was introduced into the literature by Sumner (1906), who considered it in a social context. He pointed out that ethnocentrism is an attitude, in which an own group is treated as a reference point for other groups. In other words, an own group, so called 'we group', is a basis for the evaluation of all external groups, so called 'out groups'. The sociological concept of ethnocentrism was an inspiration for establishing the term and research of consumer ethnocentrism. Its precursors were (Shimp and Sharma 1987), who introduced the term of consumer ethnocentrism. They defined it as a belief of inappropriateness of purchasing foreign producers' products, as this may have a negative impact on the domestic economy. Since the moment when the phenomenon of consumer ethnocentrism was described, we have been able to observe a development of works dedicated to that topic in the marketing publications. Despite some differences in defining consumer ethnocentrism, it can be stated that it is understood as consumers' preference for domestic products over the products of a foreign origin (Lindquist, Vida, Plank, Fairhurst 2001; Smyczek 2006; Wolanin-Jarosz 2013). The development of a measurement instrument CETSCALE[13] (Shimp and Sharma 1987) that was used in many research works, had a positive impact on the popularity of research on consumer ethnocentrism. That instrument defines the willingness for preference for domestic products, through referring to four groups of psychosocial factors: cultural openness, patriotism, conservatism and collectivism (Ruyter, Birgelen, Wetzels 1998).

The research surveys carried out in various countries show that the level of consumer ethnocentrism measured with the CETSCALE is considerably diverse. Poh-Chuin T., Osman M., Ramayah T., (2001) in their overview give the examples of the studies in which ethnocentrism index oscillated between 28,7 to 61,5.

Product's country of origin is a factor taken into consideration in the studies of consumers' choices of both domestic and imported products. A country of origin can also be related to perceived products' quality Schnettler et al. (2011) and thus indirectly have an impact on consumers' confidence in a product. As indicated by Wang and Chen (2004), when domestic, local and foreign products

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[13]   CETSCALE methodology is based on the Likert scale and consists of 17 statements rated from 1 to 7 (or from 1 to 5).

do not differ in terms of the quality, a significant number of clients, before making decision on a purchase, are interested in information on a country of origin. In developed countries, consumers show a tendency to perceive domestic products as high-quality ones. Thus, they are less willing to buy foreign products as they often perceive them as lower-quality ones (Kaynak and Kara 2002).

Each product should provide consumers with the values that will build their satisfaction. It results from all impressions and feelings that appear during a consumption process and that are kept in buyer's memory after consumption is finished. The diversity of factors taken into consideration by consumers when making choices (Hamelin, Ellouzi, Canterbury 2011) and the extent to which each attribute meets client's expectations, create the total satisfaction.

The importance of a country of origin for Polish consumers was the subject of the scientific studies. For instance Rojek (2007) and Maison (2004) show that Poles declare to prefer Polish products, which confirms their ethnocentric tendencies. However these declarations were not reflected in consumers' real choices, which meant inconsistency of consumer attitudes. In the studies carried out among students it was stated that evaluation of Polish products against foreign ones depends on a category type, which these products belong to (Patrzałek 2013).

Consumers have various views on products' origin, which in the literature is linked also with the stereotypical images of a country, in which given goods are produced. Romanowski (2013) links that with the level of given country's development as well as with its achievements in the international arena. The stereotypes are also the result of limited knowledge on individual countries and thus they have strong impact on perception of products originating from these countries (Figiel 2004).

2   Data and Methods

This article was prepared on a basis of the primary materials from a face to face questionnaire survey. Respondents were selected by a non-random, quota sampling (Kaczmarczyk 2003) so that their age structure corresponded with general population's age structure. The respondents' age distribution was presented in the table 2. After verification and reduction of questionnaires, there were total 423 interviews qualified to the analysis. The respondents were the individuals responsible for supplying households with food products. The interviews were carried out in selected locations in north-western Poland.

Table 1 **Age distribution of the respondents, N=423**

Age group	Percent
<= 29 years	28,4%
30-44 years	25,3%
45-64 years	29,8%
65 and more years	9,5%
No answer	7,1%

Source: Own research.

The intensification of ethnocentric attitudes towards the food market was identified based on the 17-element CETSCALE proposed by Shimp and Sharma (1987). Classical statistics as frequency analysis were used to analyze the results. Chi-squared test was used in order to determine relation between ethnocentrism attitude and perception of product features related to its country of origin.

The sample selection was not random it means that study results, should not be generalized to the whole population.

3   Results and Discussion

The country of origin may be an important criterion for selecting products, as shown by a survey conducted in Poland. The conducted research shows that consumers make their interest in the place of origin dependent on the product category (Table 2). The most respondents pay attention to the country of origin in the case of raw meat. In the conducted survey 143 persons declared that the place of origin of this commodity category is important for them, which constituted 31% of the respondents. The second category in which respondents consider the country of origin to be an important decision criterion is smoked meat and sausages. In this category, 28% of respondents admitted that the country of origin is the factor considered by them at the time of purchase. A comparable percentage of respondents admitted that they pay attention to the place of origin when buying eggs, bread and cereal products, as declared by 27% of the respondents. Dairy i.e. milk and cheese were on the next positions. Here, 26% and 23% of respondents respectively considered the country of origin as a factor to be taken into account when shopping. These categories are mostly of a mass nature. This means that there are no strong product brands in these markets. It may be suggested that the country of origin in this case replaces the brand of the product by acting as a guarantor of quality.

On the other hand, if we analyze the categories of products in which the country of origin does not play a significant role as a factor influencing purchasing

decisions, we can find here many markets where there are well recognizable brands. Thus, the least interest in the country of origin of the product was noted in the case of non-alcoholic beverages. In this category, only 9% of respondents are interested in the country of origin of the product. In the oil category, 11% of respondents showed interest in the country of origin. In the case of alcoholic beverages, 12% of the respondents pay attention to the country of origin. Another category where the country of origin plays a marginal role as a selection criterion is chocolate and confectionery, here as on the beverage market there are distinctive brands, which probably made only 13% of respondents admit that they are interested in the country of origin when buying product in this category. In conclusion, on the basis of the data provided, the frequency of attention to the country of origin varied according to the category of product. For fresh products and where there were no branded products on the market, respondents referred to the country of origin as a selection criterion, whereas where the market was rich in strong brands, consumers did not show an interest in the country of origin.

Table 2 **Percentage of population concerned by a country of origin in selected product categories**

Product category	Percentage of persons concerned by a country of origin
Raw meat, poultry	31%
Smoked meat, sausages	28%
Eggs	27%
Bread and cereal products	27%
Milk	26%
Cheeses	23%
Fruits	23%
Fish	22%
Vegetables	22%
Yoghurts, soft drinks and dairy desserts	19%
Sugar, jams, honey	16%
Chocolate and sugar confectionery	13%
Alcoholic beverages	12%
Oil	11%
Non-alcoholic beverages, e.g. coffee, tea	9%

Source: Own elaboration.

The country of origin may also carry complex information on the characteristics of the product. In the conducted survey respondents were asked whether they would assign a given characteristic to a domestic or a foreign product. The results of the test are presented in the diagram (Figure 1).

Figure 1 **Consumers' preferences towards selected products features related to the country of origin**
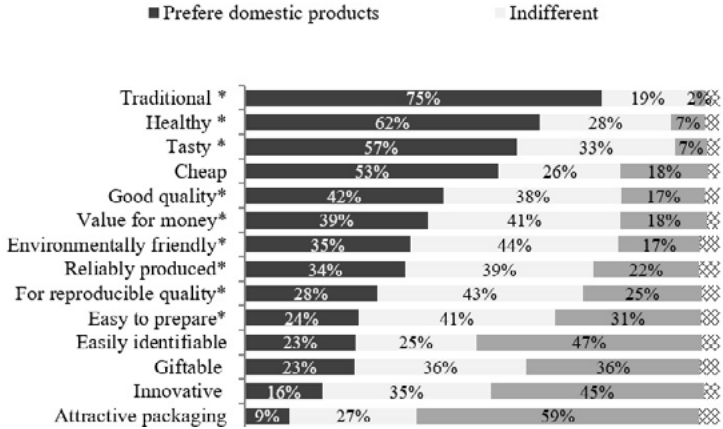
Source: Own elaboration.

"Traditional" has proven to be the feature most commonly associated with domestic products. In the survey 75% of the respondents claimed this to be the case. Only 2% of respondents considered it as a feature of a foreign product and 19% considered it a neutral one - not differentiating between domestic and foreign products. The second characteristic of domestic products was "healthy" - 62% of respondents considered it typical of a domestic product and only 7% said it was more characteristic of a foreign product. The third distinguishing feature of domestic products was their taste - 57% of respondents considered that the good taste was more typical for domestic products. At the same time, only 7% of respondents considered this characteristic to be typical for foreign products, with a high percentage of people who did not decide to assign it neither to a local nor to a foreign producer. Another characteristic of local products was their low cost of ownership. Polish products were considered cheap by 53% of respondents, at the same time 18% stated that it is appropriate for foreign products, and 26% considered this feature as not related to the country of origin of the product.

A fairly similar response profile accompanied features such as "good quality", "value for money" and "environmentally friendly". These features were considered typical for domestic products by 42%, 39% and 35% of respondents respectively,

while 17%, 18% and 17% of respondents considered these features appropriate for foreign products. In this group, the percentage of people for whom these characteristics were not associated with the country of origin increased significantly. The penultimate feature associated more often with Polish products than with foreign ones was the reliability of production - here 34% of the respondents considered it as characteristic for domestic products, and 22% indicated that it is more typical for foreign products, with the most of the respondents, i.e. 39%, not assigning it to the country of origin. The last property that was more often considered to be typical for domestic products than for foreign ones was 'guaranteeing repeatable quality'. Here, 28% of respondents considered this characteristic to be typical for domestic products and 25% considered it more characteristic for foreign products. However, also here the majority of respondents (43%) did not associate this feature with the country of origin. "Ease of preparation", as in the previous case, is usually not associated with the country of origin, however, if consumers classify it by country, they more often assign it to foreign products (31%) than to domestic products (24%). "Easily recognizable", "innovative" and "with attractive packaging" are the features most often associated with foreign products (47%, 45% and 59% respectively). In the case of the "giftable" feature, the same percentage of respondents associated the feature with a foreign product and treated it as neutral towards the country of origin (36%). On the other hand, only 23% of the respondents considered this feature to be more typical for Polish products. Analyzing the profile of respondents' answers it can be noticed that the characteristics typical for foreign products are rather "external" - they concern brand and packaging recognition, perceptions (suitable for gifts, innovative), while most of the characteristics specific for domestic products are closely related to the characteristics of the basic product (e.g. tasty, healthy, of good quality). An interesting direction of research could be to determine the reasons for such an "image" and to determine the methods of shaping particular features in the case of domestic and foreign products. An exemplary interpretation could be based on the hypothesis that external features are mainly shaped by marketing communication and that product features result primarily from the experience of users, although of course they may also be the subject of communication.

In the case of 9 features visible on the figure 1 and denoted by star a correlation between the answers and the degree of ethnocentrism was discovered. The degree of ethnocentrism has influenced the responses to features such as "traditional", "healthy", "tasty", "of good quality", "value for money", "environmentally friendly", "reliably produced", "reproducible" and "easily prepared".

4   Conclusions

The country of origin may be an important buying factor of food products for Polish consumers. The importance of this factor is linked to the product category. Fresh and low-processed products have been found to be of high importance for the country of origin. Highly processed food products which belong to the categories with strong brands seem to be selected on lesser extent based on the country of origin characteristic.

The results obtained may indicate a relation between the significance of the country of origin of the product as a buying factor and the brand position. The stronger the brand position is, the less important the origin of the product can be for consumers. This may also mean that for low-processed products, the country of origin may play the role of specific brand. These observations need to be confirmed by further research and may be used as research hypotheses for future scientific studies.

Polish consumers point to the advantage of domestic food products in terms of many attributes analyzed in the article. Consumers opinions result from differences in the image of domestic and foreign products. Local products are perceived as e.g. more healthy, traditional, tasty. These are characteristics related to the product itself and may result from the production process or the ingredients used. The advantages of foreign products are associated to the marketing activity of enterprises, e.g. factors "easy to recognize", "innovative and attractive packaging".

The results of study indicate, first of all, a significant level of ethnocentrism among Polish consumers, who may prefer domestic products, especially towards low-processed products. Secondly, study results provide valuable input to the marketing communication strategies and products development strategies run by food manufacturers.

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DEVELOPMENT OF ADVERTISING SPENDING IN SLOVAKIA

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Abstract

Advertising, as one of the communication mix tools, can be considered as the most visible but also the most discussed tool. Many perceive advertising as an unwanted component of everyday life. On the other hand, the creation and examination of this phenomenon involved too much effort and time so that it could be simply disheartened and displaced. The submitted paper presents the results of the survey on development of advertising spending in Slovakia. In paper is analyzed a total of seven time series of advertising spending by media type. We calculated 582 different models for all analyzed spending timelines, from which had been model MAPE chosen as the most suitable one. The main objective of the presented paper is the usability of adaptive approaches to modeling the development of time series empirically verified on a set of monthly time series of advertising spending by media mix for the years 2005 to 2017 and their prognosis from January 2018 to December 2019. Almost all time series had very complex and irregular course with a lot of fluctuations. The quality of the forecasts was judged by the average relative error predicted by MAPE. Winters´ method used in the paper is a generalization of the exponential equalization method which, in addition to the trend component Tt, also covers the seasonal component St.

Developments of advertising spending in TV very responsively respond to the economic situation in Slovakia when it grew during the period until mid-2009, and its downward trend occurred in the crisis period (2009 and early 2010). From this period until December 2017, spending has grown, but at a much slower pace than in the first period until 2009. We can expect to see a moderately rising expenditure

as calculated from the projected forecast in the period (January 2018 to December 2019).

Total advertising spending in the pre-crisis period increased with periodic fluctuations until October 2008. During the crisis, 2009 to 2010 saw a significant reduction in total expenditure. However, the periodic fluctuation is similar to the previous period and is also significant in the next period until the end of 2017. After the crisis, growth in spending has not reached the growth rate with pre-crisis times. In the construction of the forecast, we expected a slight increase with the maintenance of periodic fluctuations.

Keywords: *Advertising Spending, Prognosis of Development, Analysis of Time Series.*

JEL Classification: *M31, M32, M39.*

1   Introduction

Advertising has evolved into a vastly complex form of communication, with literally thousands of different ways for a business to get a message to the consumer. Today's advertisers have a vast array of choices at their disposal (**Ang & Eisend, 2017**). The internet alone provides many of these, with the advent of branded viral videos, banners, advertorials, sponsored websites, branded chat rooms and so much more (**Rybanská, 2015**). Advertising is part of our social and economic system. Within the economic system, advertising has evolved into a communication system for both consumers and enterprises. The ability of publicity in addressing the prepared messages to the target groups through the advertising and other promotion methods assigns its important role in the marketing programs of most enterprises (**O'Keefe, 2017**). Enterprises are actively oriented to promote their products and services on the market. Consumers have learned to rely on advertising and its forms with respect for information that could be used in their purchase decisions. The increase in advertising spending reflects the fact that marketers recognize the value and importance of advertising. Despite the challenges facing traditional advertising (**Cho & Cheon, 2004**), advertising is still a highly important part of the marketing mix for most successful brands (**Yoo, B., N. Donthu & S. Lee, 2000**).

Advertising is essentially impersonal and indirect form of market communication, whose role is to support the identified market offer in order to obtain and then also to accept the purchase of as many customers as possible (**Holienčinová, 2013**). Advertising includes messages that the company pays for, delivers through a mass medium and uses to persuade consumers. The three general advertising

objectives are to inform, to persuade and to remind customers. Within these broad goals, companies normally have more specific, quantified objectives, as well (**Šugrová et al., 2017).**

Advertising is essentially aimed at maximum efficiency. Decisions about advertising should be directed to make its efficiency even stronger, deeper and broader. All measures from the advertisement planning to its implementation must include an element of efficiency (**Košičiarová, 2013**). Efficiency is considered to be the dominant principle of all advertisements. And to efficiency are subordinated all matters related to the choice of advertising carriers, advertising resources, deployment time and released funds for advertising.(**Kretter & Kádeková, 2011**). Advertising involves investment of funds. Hence, it should produce a reasonable return on the said investment in order to assess the desirability and profitability of advertising.

General view on advertising, especially advertising spending differs. Half of all global advertising spending will be spent online by 2020, matching the worldwide combined "offline" advertising spending, such as TV, print advertisement and billboard posters, according to predictions. Digital media will take 44 percent, or $237 billion, of all ad money spent globally in 2018, reaching 50 percent, or $291 billion, by 2020. All forms of digital advertising are on the up, with search advertising the largest segment by far. Marketers are expected to spend $113 billion worldwide next year. Businesses are expected to spend $147 billion on mobile advertising of all types next year, up 27 percent. Brands have ever more ways to reach consumers and some are switching most of their ad spend online (**CNBS, 2018**).

Global advertising spending in 2014 and 2015 and a forecast until 2020 is as follows: in 2017, advertising spending worldwide exceeded 591 billion U.S. dollars. The source projected it would further grow to 724.1 billion by 2020. Television is the largest ad medium worldwide. In 2016, it accounted to 35.5 percent of the advertising spending. The largest advertising market was the United States with 190.8 billion U.S. dollars in advertising spending, followed by China and Japan (**Statistra, 2018**).

Professional global advertising spending predictions have been also released by **Zenith, MAGNA & Dentsu Aegis Network** (2018).
The global advertising spending trends for each showed slower spending growth in 2017, with recovery in 2018 (Figure1):
- Zenith: 4.8% in 2016; 4.2% in 2017; and 4.1% in 2018;
- MAGNA: 5.9% in 2016; 3.7% in 2017; and 4.5% in 2018;
- Dentsu Aegis: 4.8% in 2016; 3.8% in 2017; and 4.3% in 2018.

Looking at the areas that will see the fastest growth, the reports are generally in agreement that the Central & Eastern European region will be among the leaders:

- For Zenith: Eastern Europe & Central Asia (+9.8%) will lead the way, while the Middle East and North Africa will see a large contraction of 18.6%;
- For MAGNA: Central & Eastern Europe will top the regional charts with growth of 7.2%; while
- For Dentsu Aegis: Central & Eastern Europe will see above-average growth of 6.6%, though this will trail the regional leader, Latin America (7%).

In terms of individual markets, Dentsu Aegis predicts that India will see the most rapid growth this year, with ad spending climbing by 13%, up from 11.9% last year.

Next up is Russia, which will flirt with double-digit growth in ad spending (9.8%) this year after an 11.4% hike last year.

MAGNA comes up with similar numbers, forecasting low double-digit growth for Russia (~10.5%) and an 11.5% gain for India. (**Zenith, Magna & Dentsu Aegis Network , 2018**)

Figure 1 **Global Advertising Spending growth in % 2016-2018**
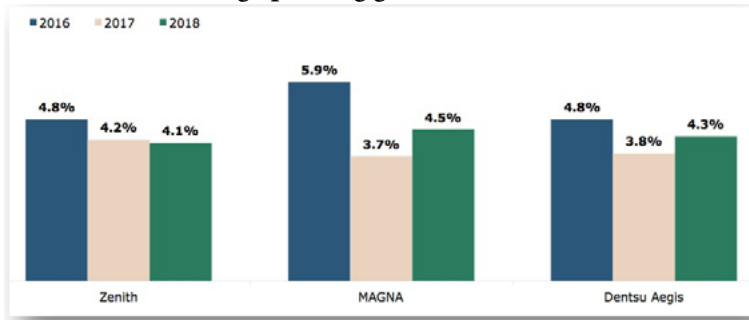
Source: Zenith, Magna, Debtsu Aegis Network, 2018.

2   Data and Methods

The use of mathematical and statistical methods in various forms of optimization practices has an irreplaceable place at the present time. This is also the case with predictions, respectively forecasts of such indicators that develop under the influence of various factors of the current turbulent economic environment in our country. The timeline is so marked by the instability of the environment, its development is often a chart reminiscent of the patient's cardiogram. Classical

methodology of analytical alignment of such time series does not achieve the required reliability. However, methodological approaches to statistical forecasting use methods which, with a high degree of reliability, can also model such an economic reality. We also advise adaptive approaches to modeling the development of time series.

The main objective of the submitted paper is the usability of adaptive approaches to modeling the development of time series empirically verified on a set of monthly time series of advertising spending by media mix for the years 2005 to 2017 and their prognosis from January 2018 to December 2019. Data for research had been obtained from Kantar Slovakia Ltd. (ww.kantarmedia.com). Almost all time series had very complex and irregular course with a lot of fluctuations. The quality of the forecasts was judged by the average relative error predicted by MAPE.

Winters´ method used in the paper is a generalization of the exponential equalization method which, in addition to the trend component T_t, also covers the seasonal component S_t. When comparing with exponential equalization, the Winters´ method is more appropriate for the time series showing the seasonal nature, because in addition to the adaptive trend estimate, the seasonal component is also adaptively estimated, so that, predictions are more accurate. For simplicity, the description of the Winters´ method will be limited to the case where the trend component of the analyzed time series can be considered linear in the short stretches of the line in the following formula (1):

$$LFI_j^i = 100 \; \frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^{N}(x_j^i - m_j^i)}{\sum_{j=1}^{N}x_j^i + m_j^i} \; \frac{x_j^i + m_j^i}{\sum_{l=1}^{N}x_j^i + m_j^i}$$

as in the case of double exponential equalization, because this assumption is practically realistic in practice. Multiplicative and additive decomposition works with three equalization constants α, β and γ from the interval (0,1). Their values should be optimally selected in the first phase of the Winters´ method. Let L denote the number of observations (seasons) per year. The estimates of parameters β_0 and β_1 and the seasonal component S_t constructed at time t are denoted as $b_0(t), b_1(t)$ and $s_t(t)$.

Let´s formula (2):

$$a_0(t) = b_0(t) + b_1(t)t \quad (2)$$

denotes an estimate of the trend level at time t constructed at time t. The pair of estimates $b_0(t)$ a $b_1(t)$ or $a_0(t)$ a $b_1(t)$ describe the linear trend in an equivalent way (only the start of the time gauge is changed). For some formal reasons, only the estimates $a_0(t)$, $b_1(t)$ a $s_t(t)$ will be used in the next interpretation.

Multiplier Winters´ Method

In this method, we assume a multiplier decomposition of the time line as follows (3): $y_t = T_t S_t E_t$ (3)

The relevant recursive relationships for the calculation of $a_0(t)$, $b_1(t)$ a $s_t(t)$ at the transition from time t-1 to time t, when is given the new value y_t of the given time series as follows (4,5,6):

$$a_0(t) = \alpha \frac{y_t}{S_{t-L}(t-L)} + (1-\alpha)(a_0(t-1) + b_1(t-1))\ (4)$$

$$b_1(t) = \beta(a_0(t) - a_0(t-1)) + (1-\beta)b_1(t-1)\ (5)$$

$$s_t\left(t\right) = \gamma\frac{y_t}{a_0(t)} + (1-\gamma)s_{t-L}(t-L)\ (6)$$

When calculating the estimates $a_0(t)$, $b_1(t)$ and $s_t(t)$, then the prediction of the value constructed at time t takes following form (7):

$$\mathring{y}_{t+\tau}\left(t\right) = (a_0(t) + b_1(t)\tau)S_{t+\tau-L}(t+\tau-L)\ (7)$$

In this relationship, we use an estimate $S_{t+\tau-L}(t+\tau-L)$ rather than an estimate $S_{t+\tau}(t+\tau)$. However, it can happen that $\tau > L$ and the index $t + \tau$ - L therefore apply to the period for which the seasonal component is not yet known. In that case is needed to use an estimate $s_{t+\tau-2L}(t+\tau-2L)$ etc.

For $\tau = 0$, the relation (7) equals the value $\mathring{y}_t$ of the considered time series (3) deprived of random fluctuations.

Additive Winters´ method

We assume an additive decomposition of the time series in the following form (8):

$$y_t = T_t + S_t + E_t\ (8)$$

The same designation as the previous method applies (9, 10,11):

$$a_0(t) = \alpha\left(y_t - S_{t-L}(t-L)\right) + \left(1-\alpha\right)\left(a_0(t-1) + b_1(t-1)\right)\ (9)$$

$$b_1(t) = \beta(a_0(t) - a_0(t-1)) + (1-\beta)b_1(t-1)\ (10)$$

$$s_t(t) = \gamma\left(y_t - a_0(t)\right) + \left(1-\gamma\right)s_{t-L}\left(t-L\right)\ (11)$$

For initial estimates $a_0(t)$, $b_1(t)$ a $s_t(t)$, $t = 1 - L$, ..., 0 can be taken, for example, estimations obtained by the regression method with auxiliary variables. Prediction of the value $y_{t+\tau}$ constructed at time *t* is following (12):

$$y_{t+\tau}(t) = a_0(t) + b_1(t)\tau + S_{t+\tau-L}\left(t+\tau-L\right)\ (12)$$

Where, instead of $S_{t+\tau-L}(t + \tau - L)$ is written the most up-to-date estimate of available seasonal component.

3 Results and Discussion

In paper are analyzed a total of seven time series of advertising spending by media type. We calculated the different models for all analyzed spending timelines, from which had been model MAPE chosen as the most suitable one (the average absolute percent error of the forecast given in the last row of Table 1). The development of advertising spending for the whole period from January 2005 to December 2017 is presented in Figure 2.

Figure 2 **Development of total Advertising Spending from January 2015 to December 2017**
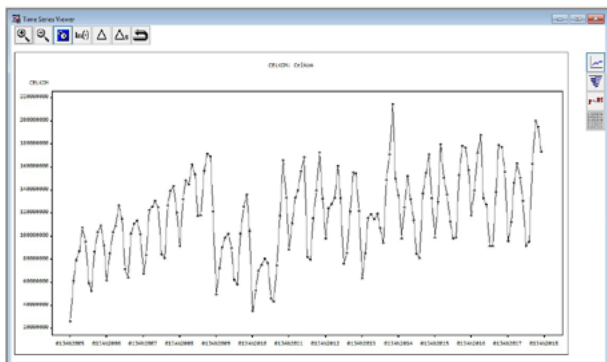
Source: Own calculations, output in SAS, based on data provided by Kantarmedia, 2018.

Total advertising spending in the pre-crisis period increased with periodic fluctuations until October 2008. During the crisis, from 2009 to 2010 is seen a significant reduction in total spending. However, the periodic fluctuation is similar to the previous period and is also significant in the next period until the end of 2017. After the crisis, growth in spending has not reached the growth rate with pre-crisis times. In the construction of the forecast, we expected a slight increase with the maintenance of periodic fluctuations. The development of the prediction from January 2018 to December 2019 is shown in Figure 3.

Figure 3 **Development of Total Advertising Spending from January 2005 to December 2017 with Calculated Prediction from January 2018 to December 2019**
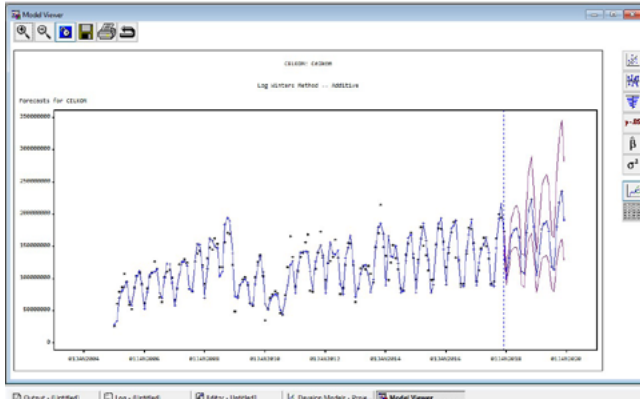
Source: Own calculations, output in SAS, based on data provided by Kantarmedia, 2018.

The calculated prediction confirmed our assumptions about periodic fluctuations as well as moderate growth which did not reach the pre-crisis tempo. For a detailed analysis of advertising spending by media type, we can see that the major part of advertising spending have been confirmed on Slovak TVs.

The development of the time series of advertising spending on Slovak TVs in the period from January 2005 to December 2017, as well as the calculated prediction from January 2018 to December 2019, are summarized in Figure 4.

Figure 4 **Development of Time Series of Advertising Spending on the Slovak TVs from January 2005 to December 2017 with Calculated Prediction from January 2018 to December 2019**
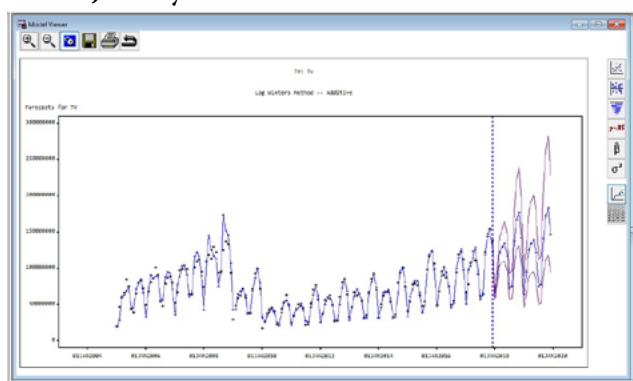
Source: Own calculations, output in SAS , based on data provided by Kantarmedia, 2018.

Developments in advertising spending on TV very responsively respond to the economic situation in Slovakia when it grew during the period until mid-2009, and its downward trend occurred in the crisis period (2009 and early 2010). From this period until December 2017, spending has grown, but at a much slower pace than in the first period until 2009. We can expect to see a moderately rising expenditure as calculated from the projected forecast in the forecast period (from January 2018 to December 2019).

The development of advertising spending on other analyzed media types is without significant decline during the crisis period and their development stagnates until the end of the analyzed period in December 2017. Even in the prediction period, the analogous development is confirmed, which was also confirmed by the calculated results of the predictions.

Figure 5 **Development of Advertising Spending on other Analyzed Media Types**
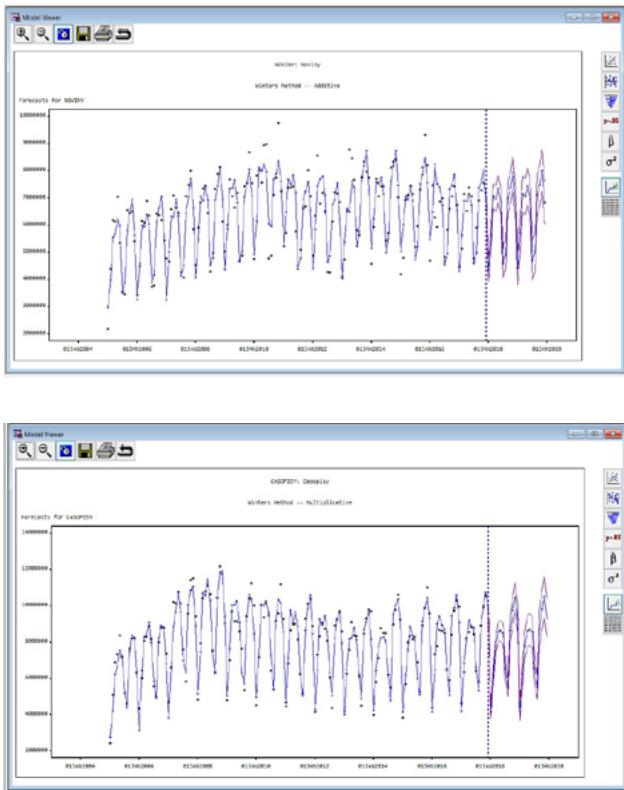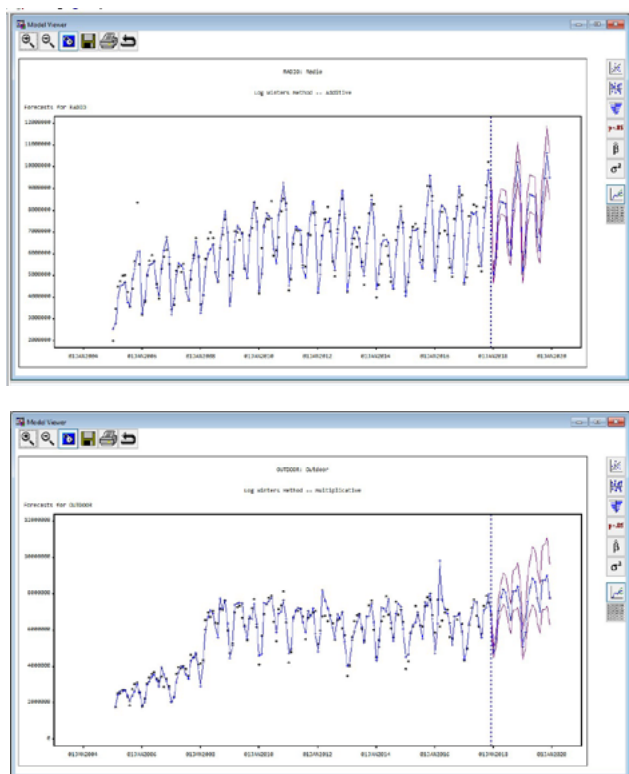
Source: Own calculations, output in SAS, based on data provided by Kantarmedia, 2018.

Estimated expected values of advertising spending for all analyzed media types are given together with the error rates of the MAPE predictions (Mean Absolute Percentage Error) in Table 1.

Table 1 **Estimated Expected Values of Advertising Spending by Media Type from January 2018 to December 2019**

Month. Year	Total	Newspaper	Magazines	TV	Radio	Outdoor	Cinemas
1.18	100, 300, 049	4, 355, 319	4, 167, 788	62, 555, 781	4, 914, 112	4, 775, 642	165, 423
2.18	132,160,056	5, 630, 460	6, 191, 095	92, 032, 897	5, 876, 674	5, 517, 012	322, 204
3.18	166, 770 ,762	7, 065, 334	7, 754, 394	122, 160, 623	7, 731, 224	7, 060, 068	483, 473
4.18	175, 397, 606	6, 973, 492	8, 543, 245	129, 721, 941	8, 411, 623	7, 816, 878	453, 885

Month. Year	Total	Newspaper	Magazines	TV	Radio	Outdoor	Cinemas
5.18	178 ,471, 912	7, 357, 929	8, 656, 152	135, 033, 434	8, 357, 196	8, 256, 343	444, 306
6.18	164 ,456, 686	6, 858, 235	8, 491, 148	117, 947, 398	8, 299, 339	8, 065, 260	584, 367
7.18	112, 121, 528	4, 607, 256	6, 513, 895	72, 679, 682	6, 531, 235	7, 274, 688	465, 377
8.18	108, 704, 222	4, 944, 806	5, 495, 689	75, 406, 473	5, 942, 451	6, 576, 263	402, 677
9.18	171, 046, 681	7, 015, 593	8, 656, 623	137, 432, 825	8, 014, 730	8, 150, 917	528, 498
10.18	206, 428, 951	7, 413, 055	9, 738, 675	166, 808, 982	9, 121, 988	8, 185, 659	515, 121
11.18	223, 254, 220	7, 922, 791	10, 452, 079	177, 356, 490	10, 240, 326	8, 410, 374	724, 252
12.18	180, 862, 779	6, 744, 153	9, 271, 408	142, 115, 632	9, 156, 349	7, 278, 385	801, 970
1.19	106, 048, 260	4, 447, 416	4, 198, 010	64, 576, 299	5, 108, 213	5, 107, 772	197, 703
2.19	139, 734, 169	5, 722, 557	6, 235, 961	95, 005, 511	6, 108, 795	5, 904, 280	385, 077
3.19	176, 328, 420	7, 157, 431	7, 810, 555	126, 106, 346	8, 036, 597	7, 563, 608	577, 816
4.19	185, 449, 670	7, 065, 589	8, 605, 082	133, 911, 891	8, 743, 871	8, 377, 912	542, 454
5.19	188, 700, 165	7, 450 026	8, 718, 768	139, 394, 942	8, 687, 293	8, 850, 807	531, 006
6.19	173, 881, 724	6, 950, 332	8, 552, 534	121, 757, 036	8, 627, 152	8, 644, 864	698, 398
7.19	118, 547, 230	4, 699, 353	6, 560, 958	75, 027, 197	6, 789, 210	7, 793, 773	556, 189
8.19	114, 934, 077	5, 036, 903	5, 535, 372	77, 842, 062	8, 177, 169	7, 042, 236	481, 254
9.19	180, 849, 392	7, 107, 690	8, 719, 092	141, 871, 832	8, 331, 301	8, 736, 418	631, 627
10.19	218, 259, 425	7, 505, 152	9, 808 ,910	172, 196, 823	9, 482, 294	8, 773, 598	615, 640
11.19	236, 048, 954	8, 014, 889	10,527, 414	183, 085, 010	10,644, 805	9, 015, 290	865, 579
12.19	191, 228, 053	6, 836, 250	9, 338, 193	146, 705, 891	9, 518, 012	7, 796, 777	958, 463
MAPE	3.49	4.21	3.65	2.98	3.44	4.31	3.66

Source: Own calculations, based on data provided by Kantarmedia, 2018.

The highest spending in the prediction period can be expected in the Slovak TVs (from € 62,555,781 in January 2018 to € 183,085,010 in November 2019). Other media are involved in substantially lower total spending (from € 4,167,788 to € 10,527,414), the smallest share of analyzed media was found in cinemas (from € 165,423 in January 2018 to € 958,463 in December 2019).

Comparing to worldwide research by leading agency for advertising **Magna** (2018), the global advertising spending growth is expected to reaccelerate to +4.5% in 2018, with the return of even-year events. Online advertising spending will grow by 14% this year while offline ad sales (television, print, radio, out-of-home) will decrease by 2% .Online advertising will pass the $200 billion mark,

to become the highest category globally, with 40% of total advertising spending versus 36% for television.

Leading forecaster **Zenith** (2018) lowered its prediction for global advertising expenditure growth in 2018 to 4.1 percent to reach $578 billion by the end of the year, with marginal downgrades in North America, Western Europe and Asia Pacific. It had also estimated 4 percent growth in 2017, down from 4.8 percent in 2016.

According to **Zenith** (2018), internet advertising overtakes traditional TV this year to become the world's largest ad medium, accounting for 37% of total spending.

The internet's share of total advertising spending will continue to grow in the coming years as it outpaces average ad spending increases across media. With an average increase of 11% per year from 2016 through 2019, the internet is expected to account for almost 42% of global advertising spending in 2019, with display growing its lead over paid search during that timeframe. Display will be powered mainly by online video (16% per year on average between 2016 and 2019) and social media (20% per year on average), though traditional display will recover from 0.7% increase last year to see 6% growth through 2019.

As for mobile, it's obviously climbing fast, representing 44.5% of internet ad spend last year and 15.1% of total global ad spend. By 2019, mobile will easily surpass desktop in digital ad spend, comprising almost 63% of internet ad expenditure and 26.3% of all ad spending.

Print, meanwhile, will see the opposite trend: newspaper ad spend will fall from 10.9% share of the total in 2016 to 8.3% share in 2019, while magazines will drop from 5.8% to 4.3%, respectively.

Separately, **WPP's GroupM** (2018) said it expects global advertising spending growth of 4.3 percent in 2018.

4   Conclusion

When summarized the above conclusions, the achieved results convincingly indicated the application possibilities of the procedure presented by us, that adaptive approaches to modeling time series and led to the obtaining of proven quality predictions for the development of analyzed time series. Even though the presented methodology is computationally demanding to meet certain assumptions about the characteristics of the analyzed time series, the results obtained indicate the relevance of their use, especially in conjunction with powerful computing techniques and quality program processing. If we summarize the knowledge we

have gained in constructing adaptive media spending patterns, we can formulate the following conclusions:

- The advantage of adaptive approaches to modeling time series of economic indicators is that they are flexible and quick to adapt to changes in timeline development. Stochastically model not only the trend component but also the seasonal component of time series
- Adaptive models are also able to describe the time series of economic indicators that develop irregularly, with a changing trend, but also with a changing seasonal component. Such time series are typical for our unstable economic environment.
- Practical applications and high-quality predictions from them confirm the suitability of adaptive approaches to modeling time series when achieving the best results compared to other methods, but we often lose the possibility of simple interpretation of the calculated parameters of the resulting models.

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CONSUMER NEUROSCIENCE AS A TOOL FOR FINDING AN EFFECTIVE CULTURAL MARKERS FOR VISUAL DESIGN

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Abstract

By determining icon image attributes that correspond with Hofstede's five cultural dimension index of the state of Slovakia, and by harnessing both neuroimaging and biometric sensor on the participants, whether the app's icon design choice has any impact value over the consumer's purchasing decision can be determined. This in turn can give an insight to the best strategy on utilizing digital visual merchandising over Android apps. The experiment showed support on Hofstede's model on cultural distinction which tells that every culture has biased preferences on design and usability. The experiment suggested that it is possible to induce iconography with the elements from Hofstede's cultural index with proper adjustments to reproduce a better design and overall a better usability.

Key words: *Android; biometric; cultural dimension; Google Play Store, neuroimaging, visual merchandising.*

JEL Classification: *M31, M39, M81*

1   Introduction

Year 2008 witnessed a new era that changed everything when Apple introduced a new medium called App Store where it opened its door to all developers to create new, fresh, exciting apps for the iPhone users. Since then, every innovative idea that came in the form of an app changes the way people use their smartphone. From simple photo sharing media like Instagram to complex infrastructure service like Dropbox, have attracted millions of users and in return, creates an immeasurable source of income for both Apple and the developers. This huge potential presumably attracts others to attempt with a similar business model. One of them being the software giant, Google, with their then Android Market, now Google Play Store.

Years later, Android has grown stronger and now poses as the largest install base of any mobile operating system with 1.6 billion active units globally as of 2014 thanks to its open nature as an ecosystem. This openness, contrary to the Apple's own walled garden ecosystem, creates more chances of expanding their multitude of user base backed by dozens of OEM adopting Android as their choice of operating system. While Apple imposes a fairly strict evaluation and tight rules over every proposed app that is trying to get published, contrastingly, Google applies a rather unrestricted policy, believing that the decision will attract more developers to develop apps for Android, thus attract more users.

While the decision to embrace a rather unrestricted and open policy has proven to be successful to bringing more and more people joining to develop apps for Android, On the other hand, Google Play Store, backed by the lack of quality control over Google's end has also attracted lots of unoriginal, unpolished, low quality apps that scatter all over the already densely populated application store. Not to mention a lot of malware trying to harm the users by disguising themselves as normal apps. Due to this problem, customers are given a hard time to choose genuinely useful apps while the developers' creations cannot get the full presence they deserve.

One of the solution is to make sure the icon design, which is one of the key factor of customer's app purchasing decision, to comfortably concur with the Material Design, a complete set of design guidelines arranged by Google subsequent to the release of the Android 5.0 Lollipop, which widely believed has been successfully boost the download rate as well as the sales, but there is currently no scientific reason behind this.

The paper suggests that there is a broader meaning beyond this simple answer. Hofstede (1980) identified that every culture can be distinguished by five cultural dimensions. This model focused on the thinking, feeling, and acting patterns that

occurs in every culture that shapes its mentality structure. Each of the five Hofstede's cultural dimension is a dichotomy and is divided by two opposing sides representing each index.

Barber & Badre (1998) also suggested that by applying culturally-specifics design elements for website design to drive more traffic. Merging culture and usability, dubbed "culturability" has been a common practice among big companies in developing the proper user interface (UI) and user experience (UX) for each different kind of countries that they invested in. Another research argued that applying specific design interfaces that accommodate only one side of the index will result an increase in web usability for all users (Ford & Kotze, 2005).

With this knowledge, there is a possible connection between the icon design presentation and the culturability factor behind it. By determining icon image attributes that correspond with Hofstede's five cultural dimension index of a certain country, one can find the perfect formula of the icon design for different culture. Hence there is a specific need to further investigate the situation. One of the related research fields is neuromarketing. Albeit controversial at its first emergence, neuromarketing is an area of study that bridges the study of consumer behaviour with neuroscience that is gaining rapid credibility and adoption among advertising and marketing professionals (Morin, 2011).

Thus the research is done by harnessing consumer's brain activity using EEG device upon seeing several icon samples induced with each of the Hofstede's cultural dimension index. This research further looking at the matter on whether the application's icon design choice has any impact value over the consumer's behaviour and perception. This in turn can give an insight of the best strategy, e.g. design attributes choice on utilizing digital visual merchandising over Android apps. This idea backed up by the paper proposed by Cole et al (2000) that believed design elements are capable of altering consumer's purchasing decision and behaviour.

1.1   Design, Usability and Culturability

Since the wake of internet era in 1980s, the World Wide Web has been dubbed as a bridge to globalization of all aspects. Mainly contributed as a powerful tool for international communication, this relatively new and fast developing medium is often developed and designed to maintain its multicultural nature. Several companies are also starting to realize the importance of designing the interface towards internationalization. This movement is viewed as a way towards global convergence, which aims for an easier way to communicate in a neutral, unbiased environment.

Despite the effort for interface globalization, It is often believed the cause of several cultures tend to have different preferences over what is considered user-friendly (Rovný, 2016). It is somewhat parallel to the fact that there are several cultural and design constraints in localized websites. Although cultural biases and preferences are part of the users' characteristics, Barber & Badre (1998) believed that there should be a focused study on these cultural biases and characteristics to find out the determining factors of usability design for international audiences. This joint study of cultural and usability is known as "culturability".

There are several researches tried to overcome the problem of missing "culturability" by designing adaptive user interface suitable for one specific cultural frame (Reinecke & Bernstein, 2007; Fraternali & Tisi, 2008; Nasrul, 2012; George et al., 2012). Fraternali and Tisi (2008) believed that the understanding of the different cultural backgrounds of users plays a prominent role in industrial product development, where requirements analysis and product design are influenced by cultural variables. While George et al. (2012) suggested a focused research towards localization rather than globalization, and it requires designers to adapt the interface to specifically targets the culture of the specific group.

Culture itself is an abstract object with layers of social values associated with ethnicity, religion, language, generation, gender, or workplace Šugrová et al. (2017). Cultural dynamics as such the case above has been an attraction for researchers in multiple fields to understand the mystery behind it, with many also tries to measure it. To do such things, one obvious course of action would be to dissect the definition of culture itself, while at the same time finding out the meta-model that create such structures, or dimension (Tayeb, 2001).

1.2   Hofstede's Cultural Dimension

Cultural usability research in the past three decades has been mainly revolt on the cultural dimension theory that was proposed by the cultural anthropologist Geert Hofstede. Hofstede (1980) revealed his model on a publication, which is a by-product of two in-house attitude questionnaire surveys of an American multinational company. Even though Hofstede's research has been considered a groundbreaking by many fellow scholars, there were a lot of cynical and criticism surrounding the model for being vague and for lacking basic theory (Fougère & Moulettes, 2007; Orr & Hauser, 2008). However, Hofstede's cultural dimensions still remain relevant and widely accepted among respected researchers despite several claims that stated otherwise. Cultural implementation on website usability and design is still one of the area that relies a lot of the Hofstede's cultural dimension theory (Paluchová & Horská, 2012). The Hofstede model is a classification of culture predicates the differences in cultural values which divided these classifications

into four different indexes, each representing a dichotomy in a continuum of two opposite values. These dimensions are known as: power distance, uncertainty avoidance, individualism vs. collectivism, and masculinity vs. femininity (Horská, 2007). Not until 1984 the fifth dimension is discovered as a result of two questionnaires among a sample of 10 and 23 international students respectively. This dimension, dubbed time orientation, is intended to embrace the two contrasting value and to distinguish between a short-term oriented countries with long-oriented ones. The five cultural dimension indexes are Power Distance Index (PDI); Uncertainty Avoidance Index (UAI); Masculinity vs. Femininity (MAS); Individualism vs. Collectivism (IDV); and Time Orientation Index (TOI).

1.2.1 Cultural Marker

Visual icons can be considered as a mean for designers to deliver messages to end-users via the interface of a computer system (Isherwood, 2009). It also plays its part as one of the ways to conveys company brandings via shapes and colours (see Figure 1). As important as it seems, icon design in application structure is often considered as the least important part of development and developers tend to deliver the least amount of effort on this particular subject. Icons are first and foremost designed to deliver the clear message, intention, and meanings of each of the interface components for greater usability. However, icon design process usually time-consuming and costly due to its dependency on usability evaluation after a set of alternative icons are developed (Goonetilleke, 2001). The issue of what should an icon depicted in each of the function it supposed to represent, and whether training affected usability performance of novice users when accessing the interface. Result shows generally shorter response times for the trained users. Icons have evolved from the concept of a sign which defined as "something that stands to someone for something in some respect or capacity" (Peirce, 1932), a sign is comprised of three interconnected elements, depicted in Figure 1; 1) the interpretant (the user that received the message); 2) the object (objects, function, or concept represented by the icon); and 3) the representant (the icon itself). This is inherently dependent on the user's knowledge, familiarity with the sign or its depicted function, usage frequency, et cetera, since each person is unique and possesses a certain cultural and social bias (Goonetilleke, 2001; Isherwood, 2009).

Figure 1 **Object, Representing, Interpreting Relationship Diagram**
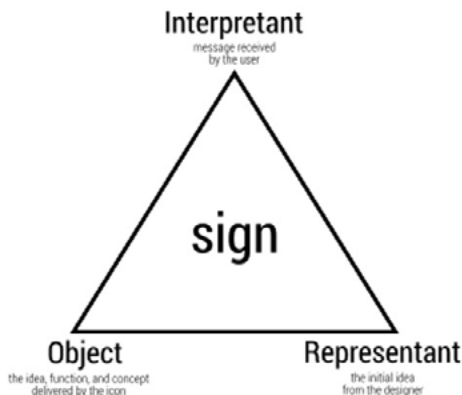
Source: Peirce, 1932.

Icons are meant to correspond with real objects with which the users are familiar with. Isherwood (2009) also stated that designer should aim for the choice of icons that correctly represent the information and accurately activate mental models in the end-user, since how the user interprets the sign will depend on the user's mental models, likewise how the designer chooses to represent the object may also depend on their own set of mental models. An established and generally accepted way to design icons is based on unifying individual icons into a collective metaphor. However, there is an apparent problem since there is a limited possibility of direct mappings between real object with system objects. Figure 1 shows the different usage of concrete icons, which the idea comes from everyday real objects. On the contrary, abstract icons are likely to represent information using graphical features such as arrows and lines and consequently have less obvious connections with their real world counterparts. Research has shown that users are more inclined to concrete icons than to abstract icons, thus prove that visually obvious symbol will be most easily understood by a user (Stotts, 1998; McDougall & Isherwood, 2009). Users' responses to icon sets in which the icon characteristics of semantic distance and concreteness were also varied. McDougall et al. (2001) found that user does not rely on visual metaphor as much as semantic distance.

2   Data and Methods

All of 14 participants were the Slovak residents with a variety of age and gender group (See Table 1). From all 14, two of them were not in a good quality therefore

only 12 of them will be used for the evaluation. All of the participants were able to understand the instruction clearly and were able to participate in a correct manner.

Table 1 **Participant Data**

Age Group	Male	Female
18-24	1	1
25-49	7	2
50-64	**0**	**1**

Source: Own research, 2017.

The experiment was divided into two parts, each of them representing different scenario. The first part was to test users' preferences on four different cultural markers. There were four set of icons induced with specific markers; 1) to test straight/ curve line preferences; 2) to test cool/warm colours preferences; 3) to test depth preferences; and 4) to test abstract/ concrete symbol preferences. Each cultural markers scenario was presented for a period of 20 seconds, while the opposite sets were presented together accordingly.

The second part was to test users' preferences on icons induced with four different cultural indexes by Hofstede. Each of the indexes was presented using four different icons which represent both opposing indexes. 1) the PDI index used different set of colours representing Slovak flag and the generic ones; 2) MAS index used a set of similar icons with different colours; 3) IDV index used a globe metaphor for browser icon each representing different continent image; and finally 4) TOI index used four different symbol for dialler icon with specific time-constraint. Each scenario was presented for a period of 15 seconds. In total there were eight different set of scenario and an average experiment time span of 140 seconds.

The experiment conducted using two different sensory devices to produce both of the neuroimaging and biometric output. The devices used for the experiment are EEG device EPOC from Emotiv for collecting participant's brain waves thus creating a heat map for the brain activity. Gazepoint eye tracker was also utilized for creating a heat map of the participant's eye movement. The data from both of the device would be used to determine user's preferences and emotions while being presented with the stimuli.

3   Results and Discussion

From the result we gather from the eye tracker motion sensor to gather user's preference on conscience level, the results were varying on the participants. From the average of participant's visual attention seen on Table 2, we can see that while the majority of participant responded faster to the left (A) stimuli, the right (B) stimuli got more view treatment.

Table 2 **Eye Tracker Result (A) and (B)**

Stim-uli (A)	View-ers	1st Viewers (s)	Viewed Times (s)	Viewed Times (%)	Stim-uli (B)	View-ers	1st Viewers (s)	Viewed Times (s)	Viewed Times (%)
1	12/12	**0,95**	3,60	17,99	1	12/12	2,07	4,35	**21,74**
2	11/12	1,11	4,25	21,23	2	11/12	**0,90**	4,67	**23,33**
3	12/12	**1,82**	3,88	19,38	3	12/12	2,12	4,36	**21,82**
4	12/12	**0,65**	4,13	20,64	4	12/12	1,37	4,88	**24,39**

Source: Own research, 2017.

The majority of users prefer icons induced with straight lines markers, with the circular and curved icons get less attention. It also appears that the participants were more inclined to icons with concrete structures rather than abstract symbols, and it is parallel with the findings from Stotts (1998) as well as McDougall & Isherwood (2009). The colour and depth markers comparison suggested that both of the factors were equally accepted with slight inclines towards warm colours and flat/shadow-less icons.

The four Hofstede's index test results were also good. Based on the pin-point of the fixation map for each of the index, we witness some high concentration in attention on particular icons, suggesting a high power level, a high masculinity level, a low individuality level, with no clear preference on the time orientation index. Although we cannot get a rather quantitative result for each of the level, it has a clear resemblance towards the Hofstede cultural index for the state of Slovakia which we get from the official website, suggesting a correlation between the model and the experiment which is suggested by Table 3 below.

Table 3 **Brief Comparison on Hofstede Model and Experiment Result**

Hofstede Index	Level from site	Experiment result
Power Distance Index	100 (high)	high
Uncertainty Avoidance Index	51 (medium)	-

Hofstede Index	Level from site	Experiment result
Masculinity vs. Femininity	100 (high)	high
Individualism vs. Collectivism	52 (medium)	medium
Time Orientation Index	77 (high)	medium

Source: Own research, 2017.

Based on the research from Önal-Hartmann et al. (2012) which suggested that activity in right brain hemisphere lead to negative response, while activity in both hemispheres suggests positive reactions, we believed that the brain activity heat map as shown by Figure 2 produced by Emotiv software is also capable of capturing the general emotions of the participants.

Figure 2 **Male and Female Brain Activity Comparison**
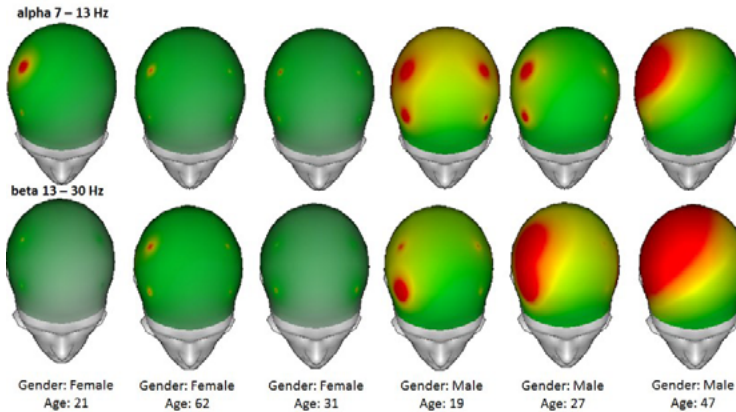
Source: Own research, 2017.

What we can see in the Figure 2 is rather interesting issue since we can see a major brain activity in both alpha and beta wavelengths on the male participant which shown otherwise by its gender counterparts. In the male participant, we can see a generally positive reaction because of the activity on both brain hemispheres on all the age range with a lot of activity happened with the older participant (age 47). While in contrast, a very low brain activity happened on all of the female subjects of the experiments. Only the younger participant (age 21) showed some negative emotion in alpha wavelength. We assume that this finding is still in its infancy age since it shows a contradictory result from the research of Collignon et al. (2010) which suggested that men have less multisensory emotional response

on particular subjects compared to women subjects. In the meantime, it is mainly believed that male and female have a distinct psychology, mental state, emotional state which plays a huge role on human history from evolutionary perspective.

The stimuli used for the experiment is not really suitable for a more thorough result of the activity therefore it only showed a little change. Nevertheless, the experiment showed that the generality of the participant has a slight higher level of emotional engagement and frustration with a rather lower excitement level (Figure 3).

Figure 3 **Emotion Chart**
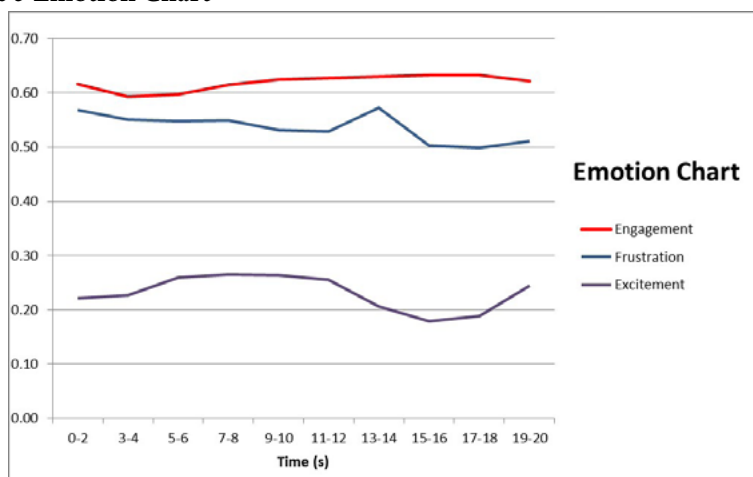
Source: Own research, 2017.

4 Conclusion

The experiment showed support on Hofstede's model on cultural distinction which tells that every culture has biased preferences on design and usability. The experiment suggested that it is possible to induce iconography with the elements from Hofstede's cultural index with proper adjustments to reproduce a better design and overall a better usability. Even so, a similar value on qualitative perspective means that there should be a way to calculate the effectiveness on quantitative scale for a statistical comparison. We also believe that there is an indication on whether a specific culture also has a biased preference towards general cultural markers such as shape, colour, depth, and symbolic preferences. This issue needs further research for a better answer. Another issue to further explore is coming from EEG result, although it is shown that the majority of the participants were

giving the positive reactions, we still see a slightly lower excitement level in general. This also needs further research to determine whether the cause of the problem was the design choice. The result in the brain activity heat map in which we found some interesting assumption also needs a further research treatment. In future, it would be necessary to include participants from different cultural environments as a control group so that we could compare results and measure the statistical significance of measured differences in cultural markers perception.

Albeit with the result of the experiment is arguably acceptable, there are still a lot of factors that need an improvement for the sake of better results. We believe that in order to have a thorough and complete statistical result, the amount of participant should be sufficient. With the amount of respondents that involved in the experiment, we could only manage to gather such small amount of data. We also found some obstacle which have various impact that implicated the findings, such as two of the 14 participant data that did not turned as desired. Another mistake happened during the preparation of the stimuli in which we missed to include one index (UAI) for the scenario, thus only four of five Hofstede index was tested. However, the data is enough to get a conclusion of the experiment. Also, this research is only applied and specified for those of Slovak residence in which we encourage other researchers to contribute on the same field of research involving other countries.

Acknowledgements

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HEALTHY FOOD RECOGNITION: THE IN-STORE DECISION-MAKING PROCESS OF YOUNG SHOPPERS

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Abstract

This paper presents the results of empirical research designed to examine the in-store decision-making process taken by young shoppers when selecting healthy cereal flakes.

The research was carried out in January 2018 on a sample of 66 students (17-18 years old) at 3 high schools located in the Wielkopolska region. Data collection was performed through an experiment and the PAPI technique. The experiment was carried out in the ShopLab at the Poznań University of Economics and Business – a research laboratory organized as a mock-up of a convenience store and dedicated to empirical studies of in-store purchasing behaviours.

The main findings show that young shoppers consider nutrients (in particular sugar content), packaging, brand and type as the most important characteristics of cereals as a product, with nutritional information being the main decision-making criteria used for selecting healthy cereals. Empirical studies conducted with the use of an eye-tracker confirmed compliance between declarations and actual behaviour only in case of nutrients. In other cases there were significant differences, as much as 50%, between the former and the latter.

Keywords: *healthy food, in-store decision-making process, young consumer buying behaviour, eye-tracker*

JEL Classification: *M31, Q13*

1   Introduction

The observed increase of interest in healthy food (Fiore et al. 2017; Hoek et al. 2017; Ghvanidze et al. 2016) has its origin in several phenomena. One of them is the growing number of obese people, which reveals the size of the epidemic and which is associated with the threat of numerous illnesses: diabetes, heart disease, hypertension (Sigurdsson, Larsen and Gunnarsson 2014; Noble et al. 2007). In connection with this numerous national programmes have been launched to promote a healthy lifestyle; such as, among other things, introducing healthy food into the mass catering offers of schools, kindergartens and hospitals (Yeh et al. 2008). Actions have also been undertaken by entrepreneurs who have increasingly introduced healthy food into their offers in stores (Śmigielska 2013) and restaurants. Unfortunately, these activities are largely ineffective (Francis et al. 2008), which can be attributed to the methods of communicating their values (Mahr, Kalogeras and Odekerken-Schröder 2013). It should be kept in mind that in the case of the retail trade, healthy food is not always displayed as a separate category, in many situations healthy products are displayed among numerous product categories, e.g. breakfast ones. This raises the cognitive (but also practical) problem of choosing a product that meets healthy requirements in the best way, and the article presents the results of a survey which was carried out along with an experiment to examine the process of in-store decision-making taken by young shoppers when selecting healthy cereal flakes.

2   Related Work

The meaning of healthy food cannot be overestimated as it normalizes the biological systems and physiological functions of the body, and maintains human well-being (Norazah 2013; Lu and Hsu 2006). It has been found that consumers have an increasingly active interest in sustainable and healthy food, although the problem of healthy food and its recognition is not a new one and has been a subject of research for almost 50 years (Lenahan et al. 1972; Jones and Weimer 1980; Capps and Schmitz 1991). In particular, attitudes towards healthy food and shopping intentions have been examined (Tung et al. 2012), but the decision-making process of purchase has relatively rarely been studied (Sigurdsson, Larsen, and Gunnarsson 2014), especially at the point where it often takes place – in the store. In the recent years many research works have demonstrated that machine learning and computer recognition techniques can help build systems to automatically distinguish diverse foods and to estimate the quantity of food (e.g. Wu and Yang 2009). But it is a much more complex task to recognize the quality of food just by

looking at a pack of flakes that is full of information: brand names, signage, numbers and pictures. So the main issue addressed in this research is to determine the stages of the in-store decision-making process.

3 Research

The main aim of this research was to identify what criteria are taken into account when choosing a product which the buyers consider to be healthy. The study was based on products belonging to the category of breakfast cereals. It was assumed that choosing a healthy product would on the one hand force the consumers to analyse the ingredients from which breakfast cereals are made, and on the other hand it would decrease the importance of such elements of the packaging as the brand or advertising slogans. In addition, the research aimed to discover how the decision about choosing a product is made in the store. The authors also wanted to compare buyers' declarations regarding the selection criteria with their actual behaviour.

The choice of research methods and tools was determined by the research aims, and the task of comparing declarations with actual behaviour required the use of triangulation. The diagnosis of behaviour was conducted by means of a laboratory experiment, whereas the declarations were examined by means of a questionnaire. The experiment also enabled the mapping of the in-store space and an eye tracker was used as a research tool during the experiment. The people participating in the experiment were given the task of choosing the healthiest breakfast cereal (see next chapter).

3.1 Methodology

The experiment was conducted in a laboratory called a ShopLab, which serves to analyse the in-store behaviour of shoppers. For this reason the ShopLab was designed as a mock-up of a convenience store. The laboratory is equipped with a number of shop fittings such as a fruit and vegetable rack, a refrigerated display case for fresh and processed meat, a bakery display case, promotional display racks, high and low shelving, as well as a cash point. The ambient conditions in the laboratory can be controlled and the laboratory occupies a $50m^2$ room in a building of the Poznan University of Economics and Business.

The laboratory was appropriately prepared for the purpose of the experiment. The window blinds were closed to block out daylight and diffused cool lighting was used. The temperature inside the laboratory was the same as the temperature in the rest of the building. No music was played and no scents were used during

the experiment. The intention was to limit the possible factors that could distract the participants' attention from their task.

Breakfast cereals, which were the principal element of the experiment, were placed on two identical one-meter wide display racks, each having six shelves. A total of forty-four items belonging to the breakfast cereal product category were displayed on the shelves. The placement of the cereals is shown in Figure 1.

Figure 1 **The placement of breakfast cereals on the display racks**
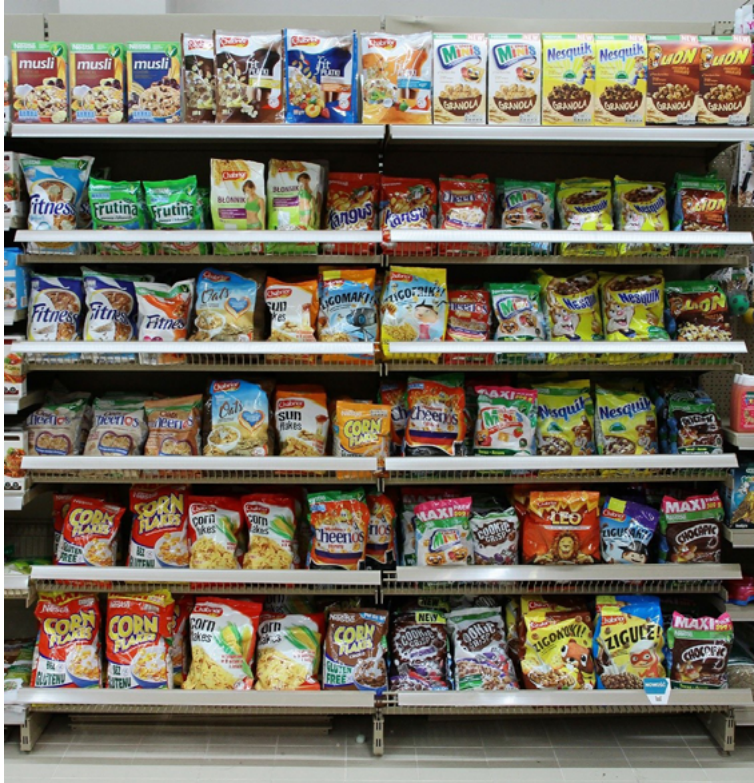
Source: Own compilation.

The experiment made use of SMI Eye Tracking Glasses 2 Wireless (SMI ETG 2w). The sampling rate was set at 60Hz, and the scene mode at 1280*960, 24Hz. The collected data was analysed using the SMI BeGaze software 3.7.42. Prior to the experiment, each participant was subjected to a calibration procedure. A one-point calibration was used at first, but when the results were not satisfactory a three-point calibration was used.

The participants in the experiment were 70 students attending three secondary schools from the Wielkopolska region (Poznań, Śrem, Słupca). They were 17 or 18 years old; with 54% of the surveyed group being female, 46% male.

3.2 Experimental scenario

Before the experiment each person was informed that participation in the experiment is voluntary and can be stopped at any time. All the participants were gathered in a room located next to the ShopLab. Each of them was individually taken to the laboratory, where they put on the mobile eye-tracker and underwent the calibration procedure. Then the participant was presented with the task of choosing the healthiest breakfast cereal. They were asked to behave 'as during normal shopping' – that is, if they wanted, they could pick up the products, look at them, compare them, etc. The participants were instructed to put the selected packet of cereal in a designated place and informed that there was no time limit. After ensuring that the participant understood the nature of the task that they were asked to perform, they were led to the shelves with the breakfast cereals. In order not to exert any pressure on the participant, the researcher left the ShopLab for the duration of the experiment. After making their selection, each participant was asked to fill in a short anonymous questionnaire, which concerned such issues as the frequency of cereal consumption, the person in the household responsible for purchasing breakfast cereals, and, above all, the declared criteria on the basis of which the participant selected the cereal.

Every effort was made to ensure that the people who had completed the experiment did not contact those who were waiting for their turn.

4 The Results

The final analysis was based on data collected from 66 participants. Four people had to be excluded due to the low quality of the obtained eye-tracking data (for example, lack of a point indicating the place of eye fixation). The exclusion of the four cases, however, did not alter the gender structure of the participants: females accounted for 54.5% of the group and males for 45.5%.

The data collected was used to calculate the basic parameters of the experiment (Table 1). The decision making period ranged from 10 seconds to 268 seconds (4 minutes and 28 seconds). The mean was 94 seconds, the standard mean error 7 seconds, and the median 85 seconds. The frequency distribution (Figure 2) demonstrates moderate positive skewness – 50% of participants needed less than 90 seconds to make their decision which accounted for 33% of the

maximum process length. The small value for the standard mean error (relative to the experimental mean) indicates that the experimental results can be treated as an accurate reflection of reality.

Figure 2 **Distribution of decision-making intervals**
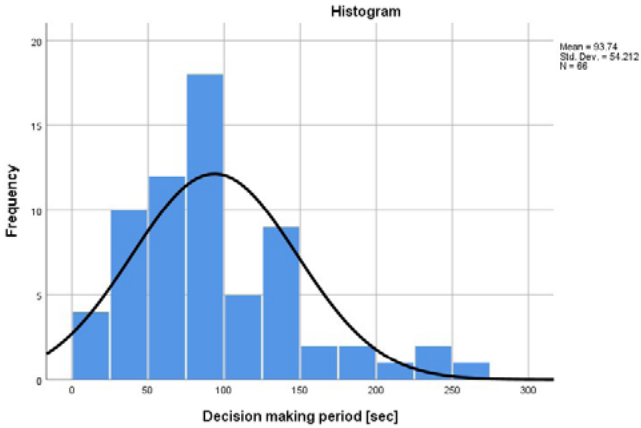
Source: Own compilation.

Table 1 **Statistics for decision making intervals**

Decision making interval statistics	Value (sec)
minimum	10
maximum	268
mean	93.74
standard mean error	6.67
median	84.50

Source: Own compilation.

Based on the experimental results, the in-store decision-making process for selecting healthy cereals has been defined as consisting of four activities:
1. Shelf eye study
2. In-hand nutrition facts study
3. In-hand package design study
4. Product selection

The first three activities can be performed multiple times in random order; the fourth activity is performed only once and finishes the process.

In the *Shelf eye study* activity, a two second fixation was assumed as a threshold; that is, participants had to hold their gaze steady facing a specific product for at least two seconds to make this product considered as 'eye-studied'. It was deliberately decided to allow such a long period of time to ensure that fixing their gaze on the specific product was the result of a participant's intentional action and not just a symptom of an 'ordinary' visual process where there are involuntary fixations lasting from 200 to 500 milliseconds (Wedel, Pieters 2015).

The *In-hand package design study* activity included all the actions of a participant in reaching for a cereal package, and then (while keeping the package in hand) holding their gaze for more than two seconds on at least one of the package's graphical elements; e.g., buzzwords, logo, etc.

The *In-hand nutrition facts study* activity also assumed holding a cereal package in hand; however, only cases where the gaze was fixed on a table of nutrition facts for more than two second were taken into account. Because such a table is typically located on the back of the package, the activity required turning the package around.

The scope of information obtainable during the *In-hand package design study* was to some extent convergent with that obtained during the *Shelf eye study*. However, it was assumed that the *In-hand nutrition fact study* and to a lesser extent the *In-hand package design study* activity indicated a more intense engagement by participants in deciding (selecting) a specific product as being healthy.

The experiment made it possible to identify the important elements in participants' behaviour. The following table (Table 2) depicts the number of products examined by participants along with specific activities performed in the process.

Table 2 **The number of products examined by participants and the specific activities performed in the process**

Number of brands	Shelf eye study (percentage of participants)	In-hand nutrition facts study (percentage of participants)	In-hand package design study (excluding nutrition facts) (percentage of participants)
0	54.5%	19.7%	54.5%
1	-	-	-
2	6.1%	15.2%	19.7%
3	12.1%	13.6%	12.1%
4	6.1%	9.1%	9.1%
5	4.5%	9.1%	1.5%

Number of brands	Shelf eye study (percentage of participants)	In-hand nutrition facts study (percentage of participants)	In-hand package design study (excluding nutrition facts) (percentage of participants)
6	4.5%	15.2%	-
7	1.5%	9.1%	3.0%
8	4.5%	1.5%	-
9	-	4.5%	-
10	-	-	-
11	30.0%	1.5%	-
12	1.5%	-	-
13	-	1.5%	-
14	1.5%	-	-
Total	100.0%	100.0%	100.0%

Source: Own compilation.

The findings show that a much greater percentage of respondents examined the composition of the cereal rather than just the package design. Only 19.7% did not scrutinise the nutrition facts relating to any of the products (with the largest number of products examined in terms of ingredients being 13); and as many as 54.5% did not pick up any product simply to look at the package design (without inspecting the nutrition facts). This essentially means that they did not examine such elements of the packaging as the brand or type of cereal. The largest number of products picked up in order to peruse the packaging was 7. The limited role of package design is also evidenced by a high percentage of people (over 50%) who, when looking at the shelves, did not focus their eyes on any specific product for more than 2 seconds. This may indicate that young consumers who are looking for healthy breakfast cereals focus their attention mainly on the nutrition facts. It is worth noting that none of the products used in this study (31) had information about the ingredients on the front the packaging, there were only statements relating to, for example, the product having a low sugar content or being gluten-free.

The results of the survey conducted after the experiment indicate that there are two issues that significantly dominate declarations as regards to the decision-making criteria for selecting healthy cereals: the respondents unambiguously indicated nutrition facts the highest (82%); with the next criterion, package design, accounting for only 27% (Figure 3).

Figure 3 **Decision-making criteria for selecting healthy cereals**
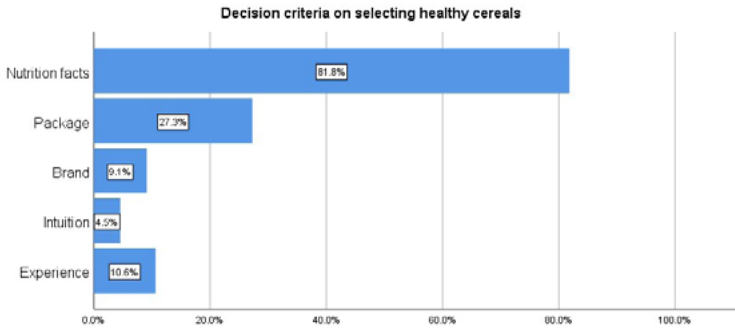
Source: Own compilation.

4.1 Analysis of behaviours in the decision-making process vs. declarations

Table 3 presents a comparison of declarations vs. actual behaviours demonstrated by participants during the decision-making process.

Table 3 **Comparison of declarations vs. actual behaviours demonstrated by participants during the decision-making process**

Decision-making criteria declared for selecting healthy cereals	Shelf eye study during the experiment (percentage of participants)	In-hand nutrition facts study during the experiment (percentage of participants)	In-hand package design study during the experiment (percentage of participants)
Nutrition facts	-	**87.0%**	-
Package design	**50.0%**	-	**44.4%**

Source: Own compilation.

As mentioned earlier, one of the objectives of this study was to compare the participants' declarations regarding their criteria for the selection of healthy cereals with their actual behaviour during the experiment. The data presented in Table 3 indicates that the declarations did not correspond to in-store behaviour. However, the extent of these discrepancies varies. The smallest difference occurred with regard to nutrition facts. In this case, 87% of the participants who

in the questionnaire declared that nutrition facts were an important factor in the selection of a healthy breakfast cereal actually analysed them during the experiment. This confirms the conclusions from the previous analyses, indicating the fundamental importance of nutrition facts when selecting food which people perceive as healthy.

Far greater discrepancies occurred among the participants who declared package design as the primary selection criterion. In this case, only 44.4% of participants performed in-hand package study activity; moreover, only 50% of participants examined any specific product when performing shelf eye study activity.

5   Conclusions and Future Work

In this paper, a descriptive model of the in-store decision-making process for selecting healthy cereals was proposed. The model was defined based on the results of experimental research on a set of young shoppers (high-school students) wearing mobile eye-tracker glasses. The model consists of four activities performed in front of store shelving occupied by cereal products. The model was contrasted with an in-depth survey on participants carried out directly after the experiment. The survey results showed that young shoppers (the experiment participants) consider nutrition facts (in particular sugar content), packaging, brand and type as the most important characteristics of cereals as a product, with nutritional information being the main decision-making criteria for selecting healthy cereals. Similar conclusions can be drawn by analysing the results of the experiment; 80% of participants scrutinised the nutrition facts of at least two products; however, in other cases there were significant differences, as much as 50%, between the survey and the experiment results.

Future research on the in-store decision-making process for selecting healthy cereals or healthy products in general should involve other groups in the broader population, selected on the basis of different criteria such as age, or engagement in making purchases for a household. Another important issue regarding the model that should be developed is its quantitative elements based on fixation times and saccade counts.

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ATTRIBUTES OF WINE ASSESSMENT

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Abstract

The quality of wine is examined by two systems: sensory and analytical. The main components in wine are finding out by chemical analysis: alcohol, extract, residual sugar, acids. The actual quality of wine, whether it is at all suitable for consumption, can only be found out by a sense-sensory assessment of a person - a taster. In the work we will deal with the assessment of wine according to the basic characteristics of the wine, namely colour, smell and taste. From these three characteristics, all other wine assessment systems will be developed, taking into account the weight of each factor. In the work we will also deal with individual types of wine and comparison of the quality of individual wines.

Keywords: *Analytical system, Aroma of wine, Colour, Sensory system, Taste, Wine*

JEL Classification: *M30, M39*

1 Introduction

The quality of wine is examined by two systems: sensory and analytical. Sensory analysis of wine is expensive and time consuming. Alternatives to characterize aspects of wine flavour and aroma are thus highly desirable.

The main components in wine are identified by chemical analysis: alcohol, extract, residual sugar, acids. Other substances contained in wine, such as aroma and taste substances, foreign substances, tannins, glycerol, colorants and others, are detected only when needed.

The chemical composition of any wine sample contains numerous small molecules largely derived from three different sources: the grape berry, the yeast strain used for fermentation and the containers used for wine making and storage. The combined sum of these small molecules present in the wine, therefore, might account for all wine specific features, such as cultivar, vintage, origin and quality.

Still, most wine authentication procedures rely either on subjective human measures or if they are based on measurable features, they include a limited number of compounds (Inostroza et al., 2010, p. 3573).

Forde et al. (2011, p. 2573) argue that the sensory properties of wine are influenced by the chemical composition of the grapes used to produce them. Identification of grape and wine chemical markers associated with the attributes perceived by the consumer of the wine will enable better prediction of the potential of a parcel of grapes to produce wine of a certain flavour.

The actual quality of wine, whether it is at all suitable for consumption, can only be identified by a sense-sensory assessment of a person - a taster.

This assessment will show us not only the quality of wines, but also their possible shortcomings, diseases or defects of wine that we could not correctly characterize in different way.

In the work we will deal with the assessment of wine according to the basic attributes of the wine, namely clarity, colour, aroma and taste. From these four attributes, all other wine assessment systems will be developed, taking into account the weight of each factor.

When assessing the whole series of wine samples, as it is practiced in quality inspections, it is easier to express different levels of quality. The differences in quality are marked by points in order to compare the results of the evaluation better. For this, a number of systems have been developed with the use of various point schemes.

2   Data and Methods

Sensory assessment of individual quality attributes is the evaluation of wine quality through individual sensory categories. Typically, a 100-point rating system approved by the International organization for grapevine and wine is used. The evaluation is anonymous. The assessor knows almost nothing about the wine he tastes. He is acquainted only with the vintage and category of wine. All other wine facts are strictly classified.

2.1   Clarity and purity of wine

Consumers have become habituated to perfectly clear wines. Considerable effort is expended in producing wines stable in terms of clarity.

A completely clear wine is a wine without any turbidity. Sparkling or lightning wines are wines, which are ripe and healthy. We assess the clarity of wine after it has been poured into dry and well-cleaned glasses. When assessing the purity, the

wine can be characterized as crystalline pure, with lightning, sparkling, clean with a weak veil (hazy), dull, opalescent, cloudy or very cloudy (Mráz, 2005).

2.2 Colour of wine

The visual attributes of wine depend on how its chemical and particulate matter transmit, absorb and reflect visible radiation. Although some of these attributes can be accurately measured with a spectrophotometer, the relevance of the data obtained to human colour perception is far from direct. White wines are characterized by various shades from very bright, greenish, yellow-green to amber – yellow and various shades of brown. The condition and the character of the wine can be determined according to the colour. Typical shades for red wine are bright red, brick- red, ruby - coloured, flame-red and dark red. The old wine is characterized by the brownish-red colour (Elsevier, 2014).

The color of wine is also affected by the age of wine. As time passes, white wines change a colour to dark. The cooler the climate is, the sourer and lighter the white wines become. On the other hand, red wines are becoming lighter with aging. Overall, the colour tells us the age of wine, the origin and the variety.

2.3 Wine aroma, bouquet

Smelling wine is one of the most important characteristics by assessment of the quality of wine. It is constituted by volatile substances. Therefore it is important to assess the wine by temperature, when the volatile substances vaporize by the same conditions. Wine aroma has to be mainly pure, characteristic for grapevine, even if it is a consumer wine which does not have the characteristics of quality wine. The aroma of high-quality wine has to be up to the character of the variety or to the type of the branded wine.

An unclean aroma with a hint of vinegar implies the beginning of wine acetification or other bacterial, unclean fermentation of wine. The unclean aroma with foreign smells hints that the wine has come into contact with the substances that transmit these smells to it. In this case, we are speaking about defects of wines (Sirén et al., 2015).

The aroma is the natural attribute of wine that we perceive with more senses. The distinction and identification of the aroma is a matter of practice and experience. Aroma identification is one of the basic aspects of tasting, which aims to create an image about the character of wine. We can create various interesting combinations and creations for wine characterization.

A very important attribute of wine is its intensity. Depending on the age, variety or quality of wine, it may vary for each wine. It is therefore very important to emphasize this attribute of wine as well.

2.4   Taste of wine

The taste of wine is composed of the complex of substances and individual components of this complex are sensed by receptors of taste. The receptors are situated on various parts of the tongue. Therefore it is important to use the whole surface of the tongue. During tasting, the wine has to move along the tongue so that the whole oral cavity will fill up and all receptors of taste will be used. The taste of wine has to be pure, without secondary flavours and harmonious. It means, that the individual components cannot stand out. If these components, such as alcohol or acids stand out, the wine is inharmonious and of low-quality. Acid content is very important for the taste of wine. Natural wine with a low acid content is soft, dull, indistinct and shows excessive acid degradation or wine deacidification (Gawel, Godden, 2008).

The taste of wine is, in many ways, the most important and most dominant wine attribute. Especially for laic and occasional wine consumers. Taste is impressive, but at the same time, it is a source of experience and enjoyment. The longer the enjoyment is, the better and more quality the wine is. By taste we assess the basic parameters of wine, such as sweetness, acidity, bitterness, or salinity. The acidity of wine is lost with age, but it adds freshness and sharpness. However, some experts claim that with age, acidity reaches the correct and optimal level.

When examining the taste of wine, another parameter is very important, namely the fullness of wine, which determines its character. The main aspect of the fullness of wine is alcohol. This is a major aspect, but by far not the only one. Wines with high alcohol content are full and heavy. Therefore, it is very important for wine, to achieve a balance in terms of sugar, alcohol, acidity and sweetness.

2.5   Total characteristics of wine

After objective assessment of influence of individual wine components, it is necessary to assess the total characteristics of wine which is given by the combination of these components and their mutual influence. And then it indicates the real quality of wines. According to the total characteristics, wines are called by special terms.

For dessert and spiced wines, the clarity, aroma, taste and total characteristics of wines are assessed, as well as for natural wines, but with taking into account the specific character of these wines. Since these wines are branded, we cannot simply

compare various types. By their assessment, we can only focus on memory, if we drank them earlier, or we can only state the quality we perceive. In other words, to see if they meet the required quality requirements (WEBASE, 2011).

2.6 Procedure for assessing wine quality

By sensory assessment we assess wines subjectively. We assess the quality, perhaps even faults and deficiencies of the wine. Samples are offered anonymous in the prescribed order and they are assessed according to charts. However, if we do not know the characteristics of individual varieties or branded wines, we cannot safely determine whether the assessed wine corresponds to the wine declared. This can only be determined when several wines are assessed at the same time when the quality of wines is compared with each other. The same procedure is performed in wine quality inspections, in wine quality competitions at exhibitions or by controlling the quality of wines produced in enterprises.

The qualities of wines are characterized by short descriptions and by the number of points which presents grades of quality. Most often used are 20 or 100 – points charts.

Table 1 **Wine rating scheme in 100 points**

		White wine	Red wine
Appearance	**quite**	0 – 8	0 – 8
	cloudy	0 – 1	0 – 1
	clear	2 – 5	2 – 5
	sparkling	6 – 8	6 – 8
Colour	**quite**	0 – 12	0 – 20
	unsuitable	0 – 3	0 – 4
	weak	4 – 6	5 – 10
	good	7 – 9	11 – 15
	full-bodied	10 – 12	16 – 20
Aroma	**quite**	0 – 20	0 – 12
	unsuitable	0 – 3	0 – 2
	weak	4 – 8	3 – 5
	moderate	9 – 15	6 – 9
	excellent	16 – 20	10 – 12
Taste	**quite**	0 – 40	0 – 40
	unsuitable	0 – 3	0 – 3

		White wine	Red wine
	empty	4 – 11	4 – 11
	good	12 – 21	12 – 21
	very good	22 – 29	22 – 29
	excellent	30 – 40	30 – 40
Overall impression	**quite**	0 – 20	0 – 20
	unsatisfactory	0 – 1	0 – 1
	sufficient	2 – 4	2 – 4
	satisfactory	5 – 9	5 – 9
	good	9 – 12	9 – 12
	very good	13 – 16	13 – 16
	excellent	17 – 20	17 – 20
	Total	**100 points**	

Source: CORNER.SK, 2008. Available at: http://wineplanet.sk/pomoc/hod-notenie-vin.

Table 2 **Wine rating scheme in 20 points**

Colour 0 – 2 points	
quite unsuitable, brownish	0 – 0,5
less suitable marking (old)	0,6 – 1,5
suitable marking (vintage, variety)	1,6 – 2,0
Purity 0 – 2 points	
cloudy with sediment	0 – 0,5
slightly cloudy	0,6 – 0,9
clean with tiny particles at the bottom	1,0 – 1,4
clear	1,5 – 1,8
clear with sparkle	1,9 – 2,0
Aroma 0 – 4 points	
foreign, quite unsuitable	0 – 0,5
indistinct, foreign, after volatile acids	0,6 – 1,5

Colour 0 – 2 points	
less suitable, less clean	1,6 – 2,0
weak but clean	2,1 – 2,5
suitable, clean, nice	2,6 – 3,5
fully suitable, distinct	3,6 – 4,0
Taste 0 – 12 points	
foreign, quite unsuitable	0 – 2,0
less clean, after volatile acids	2,1 – 4,0
less suitable, rough	4,1 – 6,0
empty, neutral	6,1 – 8,0
suitable marking, nice	8,1 – 10,0
Fully suitable marking, distinct	10,1 – 12,0

Source: CORNER.SK, 2008. Available at: http://wineplanet.sk/pomoc/hod-notenie-vin.

2.7   Conditions for sensory assessment

Sensory assessment is a cornerstone of wine assessment process. For sensory assessment of wine attributes, some conditions need to be fulfilled.

In the professional evaluation of wine quality, almost all sense organs are involved. We evaluate the appearance and colour of the wine visually, thermal and pressure feelings in the oral cavity we record by touch and with the sense of smell, we evaluate the intensity and quality of volatile aromatic substances.

2.7.1 Environmental requirements

The room where the wines are evaluated should be airy, clean, well ventilated and protected from noise, which could distract the taster. Room temperature should be 18 ° C. With falling temperature, feelings are reduced because volatile aromatic substances remain in the wine closed. Clean and dry, thin-walled and uncut wine glasses from colourless glass are used for tasting. This also requires a white background. Drinking water and pieces of bread should be available to neutralize taste buds between the assessments of individual wines. For easier assessment of wine clarity, light should be available to transilluminate the wine in a glass. The candle light is most commonly used (Leeschaeve, 2007).

When assessing, the glasses are filled to the third of their content. After tasting, we pour off the residue of the wine. Then we rinse the glass with clean water and wine, which we are going to taste, so that the taste of the previous wine cannot influence the assessment of the next sample. Tasting should be held in the early afternoon around 10 a.m. when the taster has "clean palate", that is, sometime after breakfast and before lunch when taste buds are the most active (Leeschaeve, 2007).

2.7.2 Wine preparation

In the preparation of wines, sorting out wine samples according to their characteristics before assessment is very important, so that the assessed wine is always less distinct than the following wine. Therefore, white wines are assessed before pink and red, dry wines before sweeter wines and consumer wines before quality wines. We sort them out according to the intensity of their bouquet and fullness. On some occasions, wines produced from aromatic varieties and from non-aromatic varieties are evaluated separately. When evaluating different types of wine, natural wines are assessed first, then sparkling, dessert and spiced. The temperature of assessed white, pink and dessert wines should be 10 to 14 ° C, for red wines, 15 to 20 ° C. Too many of assessed wines are dulling senses, so it is necessary to make a small break after the assessment of a certain number of samples. Optimal number of samples is 10. After several samples, the palate is tired (Mallet et al.,1999).

For each taster, there are different results of the evaluation, which are influenced by his ability to perceive the aroma and taste, habits, momentary indisposition or disposition and experience, so the results can be very individual. These shortcomings are compensated by the expertise of tasters who know well wine types, they are evaluating. In spite of that, the first two samples are evaluated collectively in order to unify their attitudes and evaluate further samples in this spirit. This procedure is very important because the tasters can underestimate first samples of wines, so without any corrections they could differ considerably from other tasters in their evaluations. In this way, it is possible to completely evaluate the quality of the same types of wines and to choose the best wine in a given range of wines.

3   Results and Discussion

According to Ugliano et al. (2015, p. 205) certain styles of wines are more responsive to oxygen than others, possibly reflecting the key role of specific aroma compounds with lower/higher oxygen sensitivity in their sensory profile. In this

study, 36 wines from different grape varieties were submitted to sensory descriptive analyses. The wines were in an age bracket of 9-19 months (whites), 5-11 months (rosé), 12-48 months (reds). Each wine had received at least two different oxygen exposure levels by means of different closures, with some wines tasted at different time points. In total, 96 wines were tasted. When considering only the contribution of closure-derived oxygen, aroma sensitivity, fruity attributes and reduction were in white wines the sensory descriptors mostly affected by oxygen. In the case of rosé wines, oxygen appeared to influence mainly aroma intensity and the red fruit attributes, whereas for red wines red fruits, cooked fruits and spices were mostly affected. Analyses conducted on selected wines indicated that esters, largely associated with wine fruity aromas were not affected by oxygen.

Only few studies have investigated the impact of vine shading on the sensory attributes of the resultant wine. But the study of Joscelyne et al. in 2007 examined the effects of canopy exposure levels on phenolic composition plus aroma, flavour and mouthfeel aspects in wine. Wines were made from Cabernet Sauvignon and Shiraz grapes (*Vitis vinifera L.*) subjected to different levels of canopy exposure in a commercial vineyard in the Sunraysia region, Victoria, Australia. Canopy exposure treatments included control (standard vineyard practice), exposed (achieved with a foliage wire 600 mm above the top cordon), highly exposed (using a foliage wire with leaf plucking in the fruit zone) and shaded treatment (using 70% shadecloth). Spectral and descriptive analyses showed that levels of anthocyanins, other phenolics and perceived astringency were lower in wine of exposed and highly exposed fruit. Descriptive analysis also showed that wines from the shaded fruit were different from other treatments for a number of flavour and aroma characters. These findings have implications for vineyard management practices (p. 10888).

Knowledge about the relation between grape and wine phenolics is of key interest for the wine industry with respect to being able to predict wine quality from analyses of grapes. Prediction of the phenolic composition and colour of experimentally produced red wines from the detailed phenolic composition of the corresponding grapes was investigated in the study by Jensen et al. (2008, p. 1105) with the use of multivariate approach. Grape extracts and wines were produced from 55 different grape samples, covering 8 different *Vitis vinifera* cultivars: Alicante, Merlot, Syrah, Cinsault, Grenache, Carignan, Cabernet Sauvignon and Mourvedre. The phenolic composition of the grapes and wines showed that the average ratios between wine and grape phenolics ranged from 0.25 to 7.9 for the different phenolic compounds. Most interestingly, the average ratios were low for anthocyanins (0.31) and tannins (0.32), intermediate for (+)-catechin (0.75) and polymeric pigments (0.98) and high for gallic acid (7.9). Individual wine

phenolics in general correlated well with several grape phenolics, indicating that a multivariate approach might be advantageous for prediction of wine phenolics from grape phenolics analysis.

4   Conclusion

Wine as a product has many attributes. In this article we focus mainly on the assessment of wine from two perspectives: sensory and analytical. We deal with four main attributes of wine, such as clarity, colour, aroma and taste. Each attribute has to be analyzed in detail in order to achieve objective results.

When assessing particular attributes of wine, certain conditions, relating to the room in which the wine assessment is carried out, wine samples and people who assess the wine, need to be kept. Not everyone can become a taster. Expert tasters are going through tests that evaluate their ability to recognize the lowest thresholds for individual taste perception. Accordingly, they are also evaluated for their ability and competence to work in the wine quality assessment committees.

The qualities of wines are characterized by short descriptions and by the number of points which presents grades of quality. 20 or 100 – points charts are most often used. It depends on that, if we analyse white wine or red wine. Most often, the colour, aroma, taste, appearance and overall impression are evaluated during the examination.

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THE BUSINESS NETWORK ROLE IN PRODUCTION SYSTEM INNOVATION: A CASE STUDY IN THE ORGANIC AGRO-FOOD INDUSTRY

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Abstract

The aim of the paper is to analyse the innovation of the production process of an agro-food SME that decide to move from conventional to organic production system. Moreover, the paper aims at analysing the role played by the business network during the implementation of the innovative strategy of entrepreneurial turnaround. By the reconstruction of the process of acquisition of the European Union certified trademark - Reg. CE 834/2007 - for organic products, the study aims at providing a dynamic description of the complex phenomenon of process innovation through the study of emerging changes in the network of business relations of the company according to the approach of the Industrial Marketing and Purchasing Group (IMP). The innovation process is achieved by the integration and development of new resources: for this purpose the firm needs to reconfigure the available resources and relationships as well as to develop the existing ones. The process of reconfiguring the network of key business relationships - both on the input side and on the company's output side - represents an interesting organizational challenge for the small business that has to face the structural scarcity of resources that has always characterized its development processes. The specificity of the process is made even more interesting by the choice of the empirical context, that is the organic food industry,

characterized on the one hand by the diffusion of narrow networks of highly local-ized producers, and by the presence of a large globalized distribution on the other.

The paper analyses a case study through a qualitative longitudinal method-ology which focuses on an organic agro-food small business located in Puglia, in south-eastern Italy. The case has been chosen among a wide network of organic agro-food producers, which represents a significant sample of the organic business population in Italy

Keywords: *Innovation, Business network, organic agro-food, production*

JEL Classification: *M31*

1   Introduction

The agro-food industry, in the particular case of the organic industry, is increas-ingly gaining the attention of researchers and policy-makers, occupying more and more space within research programs, and political plans, which deal with eco-nomic development and industrial renewal.

The present work aims at analysing the process of changeover of the produc-tive system of a small food company that chooses to switch from the traditional agricultural production method to the organic model.

The choice to produce using the organic method is increasingly configured as an innovative strategic process for the development of small rural businesses committed to producing high quality local and traditional products.

This renewal process involves an increasing number of companies, so much so that the sector has achieved significant growth rates in recent years both in Italy and in Europe.

According to the report of the Italian National Information System on Or-ganic Agriculture, SINAB 2017, the areas cultivated with organic method in Italy have reached 1,795,650 hectares, which translates into a growth of 20.3% com-pared to the previous year (2016).

The number of companies that have chosen to produce according to the or-ganic method also highlights the growth of the organic industry. In fact, 72,154 certified operators are registered, on the 31/12/2016, at the Italian Ministry of Ag-riculture database. In 2016, 12.195 businesses decided to change from traditional to organic production system.

Compared to the data referring to 2015, the total number of operators is 20.3 percentage points. The historical trend of surfaces and operators shows that in 2016 a real growth record was achieved. The analysis in terms of% change on an

annual basis, for the period 2010-2016, indicates that these growth rates have never been recorded (SINAB, 2017).

The organic agro-food production topic is also closely linked to the broader theme of sustainability, whose principles are strongly promoted by the new policies of economic development in the Community.

For some time the discussion on the themes of health and nature - two of the main themes in which the delicate debate on the environmental sustainability of industrial productions can be discussed - closely affects the choices of consumers who increasingly reward the environmental quality of certain productions (Avermaete et al., 2015).

The researchers' attention has therefore recently shifted to the business side of the issues and research efforts have intensified to study the sector, its salient features, and specific limits in the business environment.

These companies have hard problems in terms of development processes, since they suffer on the one hand from structural limitations related to the small size (especially scarcity of organizational, technological, intellectual, and financial resources), and on the other hand from the evolutionary dynamics of the food industry. The latter is strongly affected by the food supply networks globalization developed by the large distribution industry which gains increasing bargaining power toward the producers (Baregheh et al., 2014; Born and Purcell, 2006).

In this specific case, the small agri-food business is notoriously located within rural areas and develops production and production techniques from local agriculture, often also managing the entire production, processing and marketing cycle of the product (McAdam et al., 2017).

However, the certification standards of organic products are based on a complex system of rules and guarantees, which is continuously checked and updated.

The development of a model of organic production, therefore, is complex and expensive not only in terms of the resources and organizational and technological skills, but also in terms of relational skills for the small business that, developing new products, will have to develop relationships with new players through the management of supply and distribution networks.

Furthermore, the production and marketing management often implies, for the organic products, the need for the company to develop a great strategic sensitivity in order to achieve an effective market positioning and to seize the opportunities coming from new types of market (Baregheh et al., 2014). For these reasons, the organic industry lives in an important transition phase, in which high growth rates require a profound reflection on the dynamics of innovation processes in order to understand its nature, its salient factors, and to reconstruct its details. specific contents elaborating explanatory business models.

The aim of this paper is therefore to reconstruct the innovation strategy within the organic agro-food industry through the interpretive tools developed by the Industrial Marketing and Purchasing Group (Hakansson et al., 2009) aimed at analysing the interaction processes in network-level business relationships.

Moving from the research on the theme of the "new business formation and development" of the Industrial Marketing and Purchasing Group (IMP), the paper analyses the process of reconversion of the company through focusing on the development processes of the key resources in the network, and on the way these processes affected the organizational development of the company.

The process innovation analysed concerns the process of converting the production system of a small agro-food business to an organic production model. The analysis wants to describe this transformation path through the reconstruction of the contents of the interaction processes that the company has developed with the actors involved in the process. More particularly, the attention is focused on the problems faced during the start-up phase of the innovation process; on reconstructing how the innovation process developed over time; on analysing the key-actors for the observed company, both upstream and downstream; on the content of the interactive processes, in terms of tangible and intangible key resources.

The purpose of the analysis is to highlight the critical elements that slow down the development of the process. All these elements are discussed in relation to the specific characteristics of the agro-food sector (Malerba, 2004; Pavitt, 1984).

The tradition of the IMP sees the business as an actor immersed in a network of business relationships. The resources and activities of the company are inter-dependently connected to the actors of the relational network, which is why the evolutionary path of the company will depend solely on the process of developing the content of these relationships. We believe that the IMP approach, so oriented towards the analysis of the processes of development of business relationships, network inter-dependencies and the effects of these in the development paths of the company, can represent an element of absolute novelty in the branch of research oriented to the agro-food industry, so as to provide new ideas and critical points of interest to the discussion on the phenomena of innovation in this sector.

2   Objectives and background

The academic studies about the phenomena of innovation, with particular reference to the contexts of SMEs, have been particularly intensified in the last ten years. This trend arises from the explicit need of researchers to develop new

analysis models for innovation process in order to replace traditional innovation indicators - suitable for the innovative context of large companies - such as the study of R&D activities, the analysis of human resources of R&D laboratories, and the application of new patents in the company (Seaden & Manseau, 2001). The innovation process in SMEs - and especially in the sector of small agro-food businesses - innovation is considered a phenomenon associated with the individual characteristics of the entrepreneur and also, in a more limited way, the skills of the workforce present in the company (Beregheh et al., 2012). The innovative context of an SME does not foresee the availability in the company of organized and diversified internal structures capable of preparing the resources and activities necessary to support research and development processes for innovation (Love et al., 2015). The scarcity and incompleteness of the resources of a single firm implies that the innovative process can be activated only by finding the know-how and technological skills needed outside the company boundaries, that is, through interaction with other companies (Love et al., 2015).

The innovative process never develops in isolation as firms are forced to integrate the resources necessary for their development from the outside, starting from the exploration of the resources present in their business context. The identification of the importance of such a principle in the study about the innovation opened the way in the literature to the development and application of models oriented to the study of the role of the relationship between companies, and of the networks of relationships that are structured in business markets (McAdam et al., 2017). In this regard, the industrial network approach is based on a long tradition of empirical observations and case studies whose analysis shows how the interaction process that develops in the relationship between two business actors represents the substantial core from which the whole process is generated. of business - and therefore also the process of innovation - (Håkansson, 1982; Håkansson and Snehota, 1995; Håkansson and Waluszewski, 2007). The relationship is the window by which the process of organizing and developing the resources and activities of a company can be observed and analysed; interaction is the process by which such activities and operations take shape and develop (Håkansson, 1982; Håkansson and Snehota, 1995).

According to the IMP's thinking, business relationships are not only a functional link created to facilitate the meeting of companies on the market to carry out transactions, but they are the connecting tool through which the actors connect to develop and convey exchange processes. and complex development including learning, knowledge development, and innovation (Håkansson and Waluszewski, 2007). For this purpose - and in order that the development of these processes be beneficial for both parties - business relationships must develop over

the long term and create a complex process of mutual adaptation in order to combine the necessary resources. On the one hand, the combinatorial process links the activities and resources of the actors and generates a (dynamic) link of interdependence between the two companies. On the other hand, the adaptation path generates significant changes that spread across the different levels of the organizational sphere of the company in a complex way.

Hence, the understanding of the consequences that such changes have on the company provides essential information about the influence that relationships have on its internal configuration. Not only that, but in the same way the phenomena of change generated within a relationship, are transmitted through the business to the entire portfolio of direct relationships of the company - both upstream and downstream of the process - and, in a way more or less indirect, to other relationships spread in the network. Therefore, the study of relationships, and the analysis of the evolutionary processes (therefore of change) that are generated within the relationships, allow us to understand how the configuration of the resources and activities of a company depends on the configuration of external relations and not both the result of the content of the widespread processes of interactions that a company develops with its business counterparts (Havenvid et al., 2016).

The innovation implies the effort in finding new organizational, technological, operational and competitive balances. Moving from an Industrial Marketing perspective, achieving these balances means responding to the changes in the network through the development of significant company relationships. Often the change imposes itself as an unavoidable process of maintaining one's own network of relationships, such a pressure to change can be dictated by the direct (or indirect) action of external business partners who, in turn, may be driven to seek activation of innovation processes based on requests from the extended network.

From the point of view of the IMP, innovating means that companies seek the path of development by adapting to their counterparts by experimenting with "new ways of forming social bonds, combining resources and linking activities over time" (Håkansson et al., 2009).

The innovative recombination of resources, activities and relationships leads companies to create, develop, and apply new business solutions. The focal point is that through the process of interaction, companies not only develop new solutions, but also develop and share the knowledge necessary for the application and use of new solutions.

The organizational learning, for example, is a process that must be seen as endogenous to the relationship, and articulated through the interactive process. Knowledge, like innovation, is also a product of interaction, since it cannot be

detached from its context of use, otherwise the resource is useless (Håkansson and Waluszewski, 2007). For instance, the acquisition of a new production technology from the outside means for the company having to create a 'multidimensional' reception interface for the acquisition of the innovative artifact, and for the application and efficient use of the new production artefact. The company must therefore develop interfaces for interaction with the outside - and the consequent adaptation processes necessary - to interact technically, technologically, organizationally, logistically and intellectually with the supplier company and in parallel with all the other companies involved in the innovative process, whether they are suppliers or customers.

The aim of the paper is to reconstruct the process of obtaining the quality certification of the European Union (EC Reg. 834/2007) for organic products by a small agri-food company. As discussed earlier, many authors have expressed support for the need to deepen the understanding of innovation processes in the SME sector (Bessant and Tidd, 2007; Welter et al., 2017), especially by developing methodological approaches that emphasize the role of relationships and networks (McAdam et al., 2017). At the same time a great interest has been developed for the agro-food sector and for the specificity of the innovative processes that are rapidly changing its industrial and commercial context. However, in the field of research, there is still no adequate study of the specific features of the sector with regard to innovation processes (Avermaete et al., 2015). Many authors point out that much of the current research has been sclerotized around the study of high technology sectors (Welter et al., 2017), going to mechanically associate the concept of innovation solely to the phenomenon of technological development, ignoring made the extensive existing case - an indicator of the widespread, multidimensional character and complex of innovation - thus penalizing the development of the discipline both from a theoretical and a methodological point of view.

One of the objectives of the present research is therefore to spread a broader empirical view on the phenomenon of innovation, and to give depth of interpretation to the innovation process through the methodological approach of the IMP. Secondly, the study wants to focus attention on the discussion of the innovative logics specific to the agro-food sector, comparing the evidence of the most recent literature with the results of the present case study, discussing the emerging implications in an Industrial Marketing perspective.

3   Data and Methods

The study is exploratory and the methodological limits are known since they are mainly linked to the choice to develop a single case study in a longitudinal way.

However, this choice is guided by the precise intention of realizing a careful multidimensional reconstruction of the phenomenon. The innovation process needs to be analysed through the dynamic reconstruction (therefore over time) of the changes emerged along the process of productive change at the level of the single company and business network. The choice of the case study is therefore consistent to this objective (Yin, 2003), as well as allowing a closer comparison between theory and data for the development of an interpretative process as detailed and detailed (Eisenhardt, 1989).

The case study has been selected among a large group of firms involved in the organic agro-food supply chain located in Apulia, a south eastern Italian region. The firm is has been chosen because it has been the first small company in Apulia (called Alfa), in the middle '80s, to get the decision to change its agricultural productive system, moving from the conventional to the organic one; moreover the firm started its new path moving from pre-existent conventional business network with such a kind of "jump in the dark", since there were no partners, no suppliers, no specific laws, no market and no widespread consciousness of organic food. One of the main reason why we selected the case study is that it has actually created the organic business network (in Apulia and in Italy), as it has given birth to several other business realities.

The research design is structured basing on the ARA model - Actors, Activities, Resources - (Håkansson and Snehota, 1995) borrowed from the research tradition of Industrial Marketing. The focus is on the analysis of the interaction processes at the network level between three different dimensions of analysis: actors, activities, and resources.

Data have been collected by in-depth interview with the entrepreneur co-founder of the Alfa company, aimed at bringing out the process of transformation by a detailed description and a logical reasoning with the interviewee on each fundamental step of the company's evolutionary history. Data analysis aimed to reconstruct the contents of the interactive processes developed with the actors involved, the development processes of the key resources that mark the main stages of company development, so essentially the effort has been addressed to a dynamic reconstruction of the changes emerged during the production reconversion process both at the single business level and the business network level.

4   Results and Discussion

ALFA was born from the initiative of two friends, subsequently partners, both recent graduates, from Puglia, and coming from a family background well rooted in rural entrepreneurship. The two founding members of ALFA were, in fact, in turn

sons of agricultural entrepreneurs, although traditional. The entrepreneurial idea behind ALFA was therefore to innovate the family farming tradition, through the development of new cultivation techniques and organic products. The two entrepreneurs began to experiment with the cultivation of an organic olive oil on the decommissioned land of family businesses. ALFA began to develop as a completely new reality within the cultural, legislative, and structural vacuum that characterizes the organic sector in Italy in those years.

At the beginning the company started the marketing strategy through markets penetration of Northern Europe (in particular in Austria, Germany and Scandinavian countries), already prepared to recognize and reward the quality of the organic food. Here the number of consumers interested in the consumption of organic products was rapidly increasing.

In Italy, unlike Northern Europe, there was no potential market because it lacked the knowledge and awareness of the potential of organic food for human health and for the sustainability of the environment. For this reason ALFA created a company (called GAMMA) specialized in promoting the concept of organic food production and biodiversity. For this purpose, GAMMA was set up as a non-profit oriented consortium, between businesses and consumers, for the enhancement of organic agriculture. Its objectives were to implement promotion and communication actions in order to inform consumers and help them in organizing buying groups as alternative trade channels. The GAMMA's mission at that time was aimed at pre-competitive development for ALFA and for a growing number of companies that were transforming production from conventional to organic in Italy. GAMMA gradually developed the role of market promotion and (unconsciously) market shaper.

The second important aspect emerged during the interview is that, at that time, there were no official certification protocols, nor certification firms able to regulate, certify and guarantee the application of universal and recognized standards for organic farming. The entrepreneurial activity generated needs that were met by service companies geographically distant, there was the need to have nearby direct interlocutors supplier. These gaps led ALFA to found a product analysis and certification service company (called BETA) because they could not find that kind of suppliers. It represented a strong incentive to create the needed service from scratch; sometimes it was simply working to raise awareness of existing bodies towards the creation of the ad hoc service for organic production.

Another significant element for the dynamic reconstruction of ALFA's business evolution concerns the fact that the logistic constraints of large-scale distribution and the misalignment between ALFA's brand positioning strategy and the promotional strategy of large retail chains led Alfa to chose for specialized retail

trade channel. The latter allowed to achieve the correct positioning of the desired product, but then showed its logistic limitations in distribution costs. Those problems led ALFA to create another company (called DELTA), whose goal was to integrate the organic production distribution of several small organic farms which, in the meantime, were being born in the ALFA's referring network.

5   Conclusion

From the analysis of the answers of the interviewed entrepreneur, some considerations emerge about the role of the business network in the process of transformation of the organic agricultural production system.

A new network of actors emerged from the interaction of ALFA with the few actors of the pre-existing network. New resources (*control ability* and *food guarantee*) are emerging even through the difficulties experienced by ALFA through interaction in a network that slowed ALFA in the development of its activities. New actors are born from the reconfiguration of resources and competencies of ALFA. ALFA realizes that the know-how needed for its activities was developed both, directly, through the experience accumulated in the production process, and in the direct interaction of the actors who participated in this activity. The development of the relationships had a strong impact on the single organization and on the business network. The entrepreneurial ability of ALFA to seize opportunities through the reconfiguration of existing resources in different ways, by activating new connections, and nodes within the network, has been added to the capabilities of BETA and GAMMA for the success of ALFA and many other SMEs of the network.

The analysis of the collected data suggested also further research questions for future insights. In particular, an interesting research question concern how did GAMMA play the role of facilitator and Market Shaper for the several SMEs belonging to the observed network in the early years of its life and how does it do it in the current context (after more then 20 years). Furthermore, it can be helpful to achieve useful managerial implication to understand how, in the current context, can business networking support SMEs in innovating effectively their agricultural production system from conventional to organic.

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MARKETING APPROACH IN ROLE AND IMPORTANCE OF POLLINATORS IN GARDENS: A PRELIMINARY STUDY

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Abstract

The population of pollinators is decreasing despite their importance in agriculture and ecosystem. The purpose of this paper is to evaluate the situation of pollinators, including honey bees in gardens and close surrounding of selected regions in Slovakia and Poland. Primary data were obtained via questionnaire survey focused on respondents with gardens. The questionnaire was distributed online via emails and social media during July – November 2017. Respondents evaluated the population of pollinators, importance, and biodiversity using scaling method. Descriptive statistics and Mann-Whitney test were applied for data analyses. Based on results from both countries, the majority of respondents regularly observe pollinators in their gardens where the most frequent pollinators are bees and bumblebees. Nearly all respondents are aware of their role in increasing yields in gardens and consider pollinators very

important. Overall, the respondents are aware of the threat from pesticides used in intensive agriculture and perceive population of pollinators as insufficient in their gardens. However, the majority of them do not build natural shelters in their gardens. In Slovakia, most respondents usually grow bee friendly plants near orchards and vegetable gardens in order to attract pollinators, while in Poland the majority of respondents grow bee friendly plants unintentionally and not near orchards and vegetable gardens. In conclusion, people should be educated about the importance of pollinators in ecosystem and their essential role in gardens and agriculture. The most adequate teachers should be beekeepers who are familiar with this issue, and by using proper marketing communication it could create an important platform for their promotion in society.

Keywords: *marketing communication, Poland, pollinators, gardens, Slovakia,*

JEL Classification: *M31, Q13, Q57*

1   Introduction

The world ecosystem depends on pollinators including native bees, honey bees (*Apis Melifera*) and other insects as they are essential in production of many crops by providing pollination service. In general, bees pollinate vegetables, agricultural crops, flowers and wild flowers. By doing this process, they maintain ecosystem and secure proper environmental conditions for farmers and the whole agriculture (Eilers et al., 2011; Klein et al., 2006; Delaplane & Mayer, 2000). In recent years, the population of pollinators has significantly decreased. Many studies reported a certain decline in number of pollinators connected with decreased yields of agricultural crops (Aizen & Harder, 2009; Carvell, Meek, Pywell, Goulson & Nowakowski, 2007). Neither of the honeybee colonies were spared from high mortalities in the USA, Europe and Asia (Li et al., 2012; Lee et al., 2015; van der Zee et al., 2014). The sudden decline of pollinators has arisen many concerns about pollinati on and diversity crisis and problems (Tylianakis, 2013; Jacques et al., 2017). In winter 2012/2013, (see Figure 1) many European countries experienced high mortality rate of honeybee not excluding Poland (14.8 %) and Slovakia (6.2 %). The highest mortality was recorded in Belgium (35.9 %), United Kingdom (34.7 %), Sweden (32.3 %), Estonia (28 %), Finland (27 %) and France (21.9 %). In the following winter, the annual mortality rate improved in both Poland and Slovakia (<5 %).

Figure 1 **Honey bee mortality in winter 2012/2013 and 2013/2014**
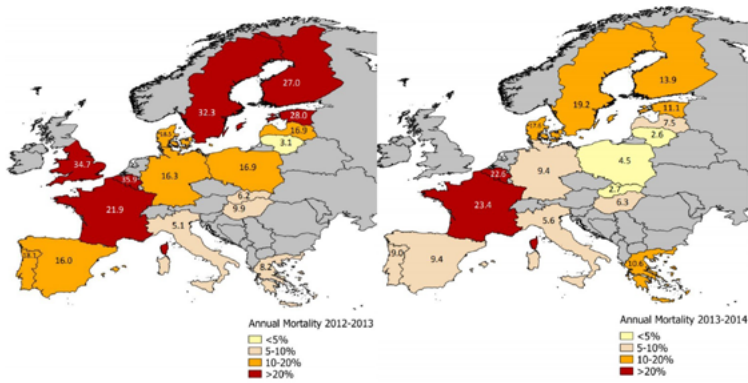
Source: Laurent, Hendrikx, Ribiere-Chabert, & Chauzat, 2016.

Overwintering mortality rate is influenced by climate, however, it depends on other risk factors involving environment, diseases, veterinary treatment, colony management and colony health (Laurent, Hendrikx, Ribiere-Chabert & Chauzat, 2016). The overall decline in the population of pollinators is connected with habitat loss, (M'Gonigle, Williams, Lonsdorf & Kremen, 2017), intensive farming, increasing amount of pesticides used in crops production (Silvina et al., 2017), decreasing biodiversity and availability of flowers in environment (Bukovinszky et al., 2017).

Current situation highlights the need for sustainable farming methods and application of integrated crop pollination, which will ensure stable pollination service. (Isaacs et al., 2017). Several studies propose to plant bee-friendly plants situated in field margins which will provide more feed and better habitat for various pollinators. Field margins will attract pollinators by the rich offer of nectar and pollen and sustain crop pollination (Kirmer, Rydgren, Tischew, 2018; Menz et al., 2010). The gardens also play an essential role in providing natural habitat for bees and other pollinators. Therefore, public interest and global awareness may lead to improvements by increasing biodiversity in private gardens with great contribution to ecosystems (Samnegård, Persson & Smith, 2011). Furthermore, public awareness leads to positive human engagement which is important for sustaining the population of pollinators and increasing biodiversity in gardens (Bhattacharyya, Acharya & Chakraborty, 2017).

The main contribution of this paper is to evaluate and study the situation of pollinators, including honey bees in gardens and close surrounding of selected regions in Slovakia and Poland. Research will be aimed at the current state of

diversity, number of pollinators, conditions in gardens and awareness of their importance and role in pollination services among gardeners.

2   Data and Methods

The study was based on primary data obtained by conducting online questionnaire survey in selected regions of Slovakia and Poland. Questionnaires in Google form were distributed via emails and social media, but predominantly via Facebook groups devoted to gardening, gardens, fruits and vegetables, flowers, horticulture, farming and nature. The survey, which lasted from July to November 2017, reached 288 respondents in the Nitra region in Slovakia and 214 respondents in Małopolska Voivodeship in Poland.

The main criteria for research sample selection were land or garden in possession. The majority of respondents were hobby gardeners mostly in rural areas (77.1 % in Slovakia) while in Poland both rural (56 %) and urban (42. %) areas. The respondents were asked to evaluate the situation in their gardens and surroundings based on their observations and according to their opinion. The questionnaire included several scaling questions oriented on rating current situation of pollinators' population and biodiversity.

The data from questionnaire survey were processed and analysed in statistical program SAS Enterprise Guide 7.1. The results were analysed using descriptive statistics, and the differences between countries in scaling questions were statistically tested by Mann – Whitney U test, which is usually applied to compare the values (averages) of two independent samples. It analyses whether two independent samples are selected from a population with the same distribution.

$$d_i^- = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_j^-)^2}, \; z_j^- = \min_i\{z_{ij}\}, \; z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j}$$

where R_1 – the sum of ranks in sample with smaller sample size
n_1 – size of smaller sample ($n_1 \leq n_2$)
n –total sample size ($n = n_1 + n_2$)
(Hudec, Sisáková, Tartaľová, &Ţelinský, 2007)
Hypotheses

H1: There exist differences in evaluation of the population of pollinators between countries.

H2: There exist differences in evaluation of the importance of pollinators between countries.

H3: There exist differences in evaluation of biodiversity between countries.

3 Results and Discussion

According to the results, the majority of respondents in both countries observe pollinators on a regular basis (Slovakia – 67 % and Poland – 68.7 %). Approximately one third observe pollinators only sometimes (Slovakia – 33 % and Poland – 31.3 %). Gardens are generally pollinated by solitary bees, honey bees, butterflies and beetles. In both countries, the most frequent observed pollinators were bees and bumblebees (see Figure 2).

Figure 2 **The most frequent pollinators observed in gardens**
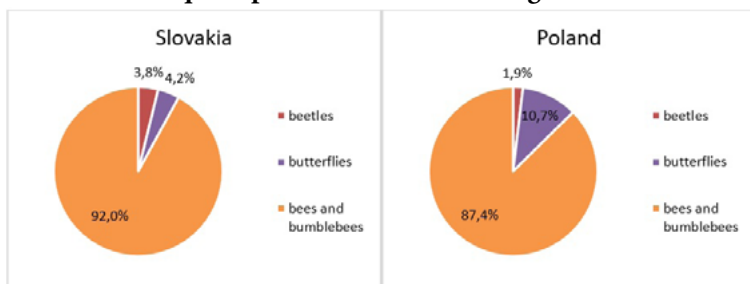
Source: Questionnaire survey, 2017.

Furthermore, respondents were asked to evaluate the current situation of pollinators in their gardens using a 7-point scale, where 1 represented overpopulation while 7 represented insufficient population. Based on the respondents' observations (see Figure 3), in both countries the majority of respondents (Slovakia – 45.1 % and Poland – 37.4 %) consider the population of pollinators as insufficient. However, at the same time a similar number of Polish respondents (36.4 %) consider it as sufficient. Importance of pollinators in gardens was evaluated using 5-point scale where 1 represented very important and 5 – not at all important. Pollinators are mostly considered to be very important both in Slovakia and Poland. From statistical point of view, according to Mann-Whitney U test in both evaluations exist differences between countries (H1 and H2 were confirmed).

Figure 3 **Evaluation of pollinators in gardens**
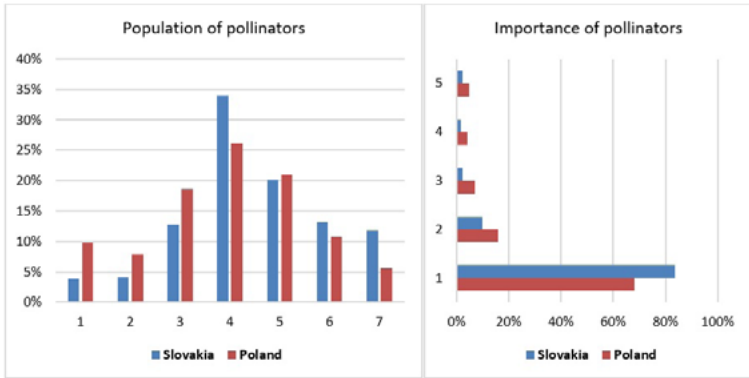
Source: Questionnaire survey, 2017.

In addition, the respondents were asked, whether they know about the current situation which is critical due to high pollinators' mortality caused by pesticides used in intensive agriculture. In both countries, almost all of them are aware of this issue (Slovakia – 96.2 % and Poland – 94.9 %), however, most of them do not build and provide bee shelters for them (Slovakia – 87.2 % and Poland – 83.6 %). Besides focusing directly on pollinators, respondents had to observe and evaluate biodiversity as an indicator of pollinators' habitat. Biodiversity in the gardens and surrounding areas was evaluated on 7-point scale where 1 represented high biodiversity while 7 represented almost absenting biodiversity. Obtained results showed that the most frequent answer in both countries (see Figure 4) was medium biodiversity, however overall rating indicates a high level of biodiversity. Afterwards, respondents evaluated the changes of biodiversity in the last 10 years. Approximately half of respondents in both countries consider biodiversity in their gardens and surrounding area without change. The rest of respondents mostly observed a decrease. Moreover, the third hypothesis was not confirmed, and there are not any differences present in evaluations between countries.

Figure 4 **Evaluation of biodiversity in gardens and surrounding areas**
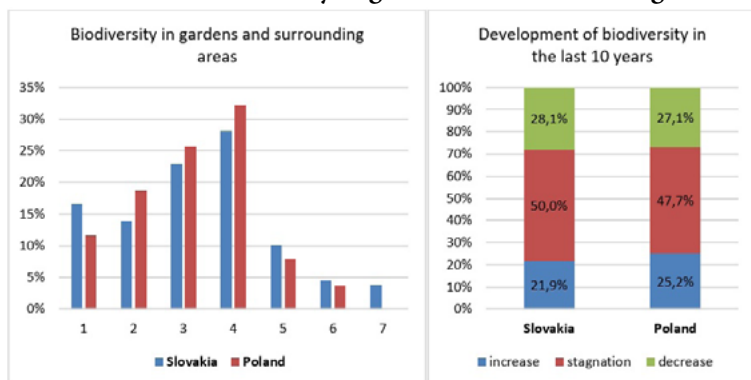
Source: Questionnaire survey, 2017.

Furthermore, the study examined whether respondents contribute to biodiversity by planting various types of bee friendly flowers. In Slovakia, the majority of them grow bee friendly plants (92.7 %), however, only one third do it intentionally with the purpose to support pollinators. Respondents mostly grow ornamental plants (46.2 %) and herbs (37.2 %) – mainly lavender (44.1 %) and mint (33 %). Despite the higher awareness of pollinators' impact on yields in gardens (95.5 %), only 57 % of them grow bee friendly plants near orchards and vegetable gardens with the intention to attract pollinators. Similar results were obtained in Poland, where the majority of respondents (79.9 %) grow bee friendly plants, out of which more than a half (53.3 %) do it without intention to help and support pollinators. The main plants grown by respondents were mostly ornamental plants (68.2 %), herbs (17.8 %) and agricultural crops (10.7%). In case of herbs, respondents prefer to plant mint (40.7 %) and lavender (34.6 %). A slightly different situation occurs in Poland, where the majority of respondents (93.9 %) are aware of the fact that pollinators increase yields in gardens, but more than 76 % of them do not grow bee friendly plants near orchards and vegetable gardens.

Similar studies focusing on consumer perception towards pollinators, bee friendly plants and pesticides indicate growing public interest in pollinators' health issues and their current threat in a form of certain pesticides. Increasing the awareness of this issue opens new market opportunities in horticulture industry to offer pesticide-free plants, seeds and bee friendly plants (Rihn, Khachatryan, Campbell, Hall, & Behe, 2016; Rihn & Khachatryan, 2016; Campbell, Khachatryan, & Rihn, 2017; Khachatryan & Rihn 2017; Khachatryan et al., 2017).

Public awareness could be increased by proper marketing communication targeted at people who own certain landscape or gardens. The fundamental tools

of marketing communication are advertising, public relations, direct marketing, personal selling, online marketing and others (Nagyová, Košičiarová & Kádeková 2014). The whole concept could be classified as a sustainable marketing where beekeepers as essential guardians of honey bees will inform and influence their customers about the current situation with pollinators by using several tools of marketing communication (Palúchová & Benda Prokeinová, 2013). In this case, the most suitable tools would be public relations where beekeepers would create a sort of storytelling connected with their beekeeping activities and presenting it as community service in a form of sustainable pollination in their surroundings (Šimo & Rovný, 2010).

Furthermore, beekeeper could increase awareness of this issue among people through personal selling, by informing and educating people. Explaining that by purchasing honey from local beekeepers they also help to sustain pollination in their surroundings and improve their situation. To increase the biodiversity, beekeepers should educate their customers which bee friendly plants should be grown. They should also explain that by improving natural habitat they support not only honeybees, but also other types of pollinators which have significant contribution to the ecosystem. Another tool which could be applied is advertising. In marketing communication, it represents strong tools for targeting a massive number of people with a purpose to inform and persuade. For instance, beekeepers' associations may use advertisement in public TV to increase the level of awareness to maximum by explaining the importance of a current situation. By applying these tools, associations could ensure better habitat not only for honeybees, but also for other pollinators, and at the same time improve quality of pasture for own bees.

4   Conclusion

In conclusion, the questionnaire survey showed similar results in both Slovakia and Poland:

- The majority of respondents observe pollinators in regular basis, frequently observe bees and bumblebees and consider pollinators as very important. Based on their observation, population of pollinators was mostly evaluated as insufficient. Almost all respondents were aware of the critical situation of pollinators, honeybees in particular, caused by pesticides. Nevertheless, more than two third of respondents do not provide bee shelters in their gardens.
- Furthermore, respondents evaluated biodiversity in gardens as well as surrounding, and most of them consider biodiversity as high. However, the most frequent answer was medium. In terms of development of biodiversi-

ty in the last 10 years, the half of respondents indicated stagnation followed by decreasing tendency. Almost all respondents know that presence of pollinators in gardens increases yields, and they grow bee friendly plants, mostly ornamental flowers and herbs such as mint and lavender. In spite of positive engagement of respondents, most of them do it without intention to support pollinators and do not grow bee friendly plants near orchards and vegetable gardens. Due to this fact, there is still space for improvements of the current situation through increasing public awareness by explaining the current situation with pollinators.

- Public awareness could be increased by applying the proper tools of marketing communication. Firstly, beekeepers could use personal selling and public relations as a way to inform, educate and increase awareness of this issue. They should explain the honey consumers that by buying honey from local beekeepers they support not only beekeepers, but also honeybee colonies, increase sustainable pollination and biodiversity as well as the whole ecosystem in their surroundings. Moreover, the advertisement could be used by beekeepers' association in order to reach a massive amount of people. For example, advertisement on TV could persuade people to grow more bee friendly plants in their gardens. That way people will be informed better, beekeepers will obtain better pasture for honeybees and by improving the overall diversity the situation with pollinators will improve as well.

Acknowledgement

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FEATURES OF CONSUMER BEHAVIOR IN THE MARKET OF MEAT CATTLE BREEDING IN UKRAINE

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Abstract

In the balance of meat of Ukraine, beef and veal, which can not be replaced, are the most important place, because each of these types of meat has specific taste properties, amino acid composition and nutritional value. However, a sharp decline in the volume of production of meat products of cattle breeding during the years of market transformations has led to a significant reduction in the consumption of beef and veal by the population against the backdrop of a decrease in the supply of domestic meat and a significant increase in its import supplies in frozen form. Consumer demand for beef and veal is due to economic, socio-demographic and specific factors. Economic and socio-demographic factors influence the consumer demand for meat products, similar to those inherent in the demand for consumer goods.

Key words: *Beef and veal market, Household income, Consumer behavior, Demand elasticity.*

JEL Classification: *Q 18, O 15.*

1   Introduction

The main objectives of the study are defined: there is a definition of patterns and characteristics of the domestic consumer market of meat products, identification of factors that determine the consumer behavior of consumers in the beef and veal market, justification of the directions of ensuring the balanced development of this market.

2   Data and Methods

In carrying out the research, the data of the State Statistics Service, observation and survey of the author were used. The calculations for the elasticity of consumer demand in the market were carried out using correlation-regression analysis and balance method in substantiating the indicators of development of consumption of beef and veal for the future.

3   Results and Discussion

It is known that end-use food indicators form the main group of indicators that characterizes the standard of living of consumers in the country. The foregoing makes it possible to determine that the state and trends of the development of the consumer market, namely volumes of commodity turnover, retail prices, have a direct influence on the volumes of consumption. The proof of this is the conclusion of the experts of the World Health Organization, who believe that the health of 50% depends on the individual lifestyle, the main factor which is nutrition [1].

Demand in the market of livestock products is formed under the influence of demographic, economic, cost factors, that is, it depends on the population, distribution of its income, quality and value of goods, commodity assortment, advertising [2].

Analyzing volumes of consumption of meat products by the population of Ukraine by species, it was established that during the last five years the main type of meat is chicken (Table 1).

Table 1 **The level of consumption of beef and veal in Ukraine**

Product type	2006		2011		2016		2016 in per cent	
	kg	%	kg	%	kg	%	2006	2011
Meat is all	42	100	51,2	100	51	100	121,4	99,6
Beef and veal	13	30	9,1	19	8,1	15,8	62,3	89,0
Pork	13	31	19	35	19	37,0	146,2	100,0
Bird meat	16	37	23	45	24	45,9	150,0	104,3
Other types of meat	1	2,3	1	1,9	0,7	1,4	70,0	70,0

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

Consequently, there is a clear tendency in Ukraine to increase the consumption of poultry meat per capita compared to the same indicator for other types of meat. In particular, consumption of poultry meat per capita during 2006-2016 increased from 15.7 kg to 24 kg. It should be noted that consumption of this type of meat is growing at a faster pace than other species. However, in recent years, the volume of consumption of pork is also increasing. It should be noted that during 2006-2016 there was a significant decrease in the consumption of beef and veal by the population of Ukraine by 37.7%. According to the FAO, real beef consumption is 6 kg per capita, which is 2.1 kg lower than the corresponding figures of the State Statistics Service of Ukraine. In Ukraine, in 2016, meat consumption has fallen behind the rational norm by 36%. In addition, the proportion of beef in the overall structure of meat consumption is the lowest. In 2016, the consumption of chicken is the highest and is about 45.9%.Inner consumption of beef is very small and is 15.8%. In addition to economic reasons, in particular inter-industry imbalances in pricing, there is also no understanding of what quality beef is. The population, feeding the cattle extensively, spends the same amount of money per kilogram of live weight, as well as intensive fattening. In this case, animals grow slowly and their mortality is 150-200 kg lower than that of animals fed by an intensive system.

Cattle meat is an expensive product, therefore, in the current economic situation, the population prefers cheaper meat (pork or chicken meat).

During 2007-2016 the price level for beef was almost twice as high as the cost of poultry meat. Also, the cost of beef during 2011-2016 was higher than the price for pig slaughter products.

Table 2 **The dynamics of prices and the price ratio for beef, pork, poultry meat**

Year	Beef	Pork		Bird meat	
	UAH / kg	UAH / kg	Value of prices for beef and pork	UAH / kg	The ratio of prices for beef and poultry meat
2007	25,52	26,88	0,95	14,62	1,75
2008	38,04	40,75	0,93	17,24	2,21
2009	38,76	43,03	0,90	18,22	2,13
2010	40,72	41,59	0,98	20,28	2,01
2011	48,73	46,48	1,05	22,40	2,18
2012	55,73	50,58	1,10	23,14	2,41
2013	53,10	48,70	1,09	21,40	2,48
2014	68,09	62,78	1,08	31,09	2,19

Year	Beef	Pork		Bird meat	
	UAH / kg	UAH / kg	Value of prices for beef and pork	UAH / kg	The ratio of prices for beef and poultry meat
2015	84,02	74,99	1,12	39,18	2,14
2016	85,61	77,03	1,11	42,02	2,04

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The high level of beef prices in 2016 was caused by several factors. First, reduce the supply. The number of cows in all categories of farms as of January 1, 2017 decreased by 57.7 thousand heads compared to January 1, 2016, including 20.5 thousand in agricultural enterprises, and 37 per cent in households , 2 thousand heads. In 2016, all categories of farms produced, in slaughter mass, beef and veal, 375.6 thousand tons, which is 8.4 thousand tons less (2.2%) in 2015. In 2016, at Recycling of cattle from all categories of farms was 123.8 thousand tons, which is less than 3.5 thousand tons compared to 2015. Secondly, the reduction of beef imports into Ukraine. In general, the import of cattle slaughter products is negligible and in 2016 it was at the level of 4-5 thousand tons.

Nevertheless, the inflationary processes that are taking place in the national economy played a role in the growth of beef prices. Thus, the average sales prices of cattle (aggregate) sold by agricultural enterprises in all directions in 2016 increased by 2.1% (436 UAH / t) and by 54.9% (7489 UAH / t) in 2014

Consequently, compared to pork and poultry meat, beef and veal are the most expensive form of meat. Consequently, the volume of domestic demand for meat from cattle, which depends directly on the purchasing power of the population, is also being reduced.

The low purchasing power of the population directly affects the level of consumption in terms of certain types of meat and meat products. An average resident of a low-income country is forced to prefer cheaper meat and sausage products made from low-grade imported raw materials [3]. Therefore, it is important to ensure not only the approximation of the consumption of meat to rational norms, but also take into account the structure of consumption of meat products in order to increase the proportion of beef in the overall consumption of meat.

Now beef is a food product for people with high income. According to research results, the highest levels of consumption are observed in households in large cities with an income level of over 6,000 UAH / month. It should be noted that in this group of households, depending on the level of income, there are significant fluctuations depending on the location. Thus, members of small town

households consume beef by 2 kg less compared to households in large cities, and rural ones - 10.5 times. This circumstance shows that beef is not a priority in consumption in rural households and small cities. This circumstance is evidence of the lack of a culture of consumption in most Ukrainians (Table 3).

It should be noted that it should be noted that there is a significant difference in the consumption of beef between 1 and 9 groups of households, regardless of their location. This circumstance is evidence of a significant impact on the level of consumption of the value of aggregate income.

Especially high dependence of households' demand on their income is on products that are in the higher price segment of the market in comparison with competitors. The same is the reaction and intermediate consumption. Thus, the meat cattle industry, whose production is in the higher price segment compared with poultry production, was most sensitive to the effects of the transformational crisis [4].

Only one to two percent of the Ukrainian population can afford to buy beef. Household incomes are decreasing, and this affects the demand for livestock products. People gradually move on to substitute products: instead of beef, they buy pork or chicken, or even whole offal. Due to low purchasing power, they are guided by the cheapness of the product, not its quality indicators.

In our opinion, the culture of consumption of beef could also be commodity producers themselves.

Beef will still be more expensive than other types of meat - the consumer needs to understand this. But producers who have a closed cycle - growing agricultural products-producing fodder-fattening livestock-processing meat - may somewhat lower prices and stimulate this demand.

Table 3 **Dynamics of consumption of meat of cattle by households of large, small towns and rural settlements depending on the level of monetary incomes**

| Household groups | Urban households | | | | Rural households | | Urban households in% to rural households | |
| | Big cities | | Small cities | | | | | |
	kg	% to the total consumption of meat products	kg	% to the total consumption of meat products	kg	% to the total consumption of meat products	Big cities	Small cities
By 1500	2,1	2,1	0,5	1,4	0,2	0,8	9,5	23,8
1501-2000	3,8	3,8	0,4	1,0	0,3	0,9	7,9	10,5
2001-2500	4,0	4,0	1,5	3,1	0,4	1,0	10,0	37,5
2501-3000	4,4	4,4	1,0	1,8	0,5	1,0	11,4	22,7
3001-3500	4,5	4,5	1,0	1,6	0,8	1,4	17,8	22,2
3501-4000	5,3	5,3	2,0	3,0	0,7	1,0	13,2	37,7
4001-5000	5,6	5,6	2,9	3,9	0,6	0,8	10,7	51,8
5001-6000	7,2	7,2	1,8	2,3	0,7	0,9	9,7	25,0
More than 6000	4,7	4,7	1,8	2,0	0,9	1,1	19,1	38,3
Total	4,2	4,2	1,0	2,1	0,4	1,0	9,5	23,8

Source: Calculated by the author.

At the same time, the issue of safety and eco-friendliness of meat consumption may remain outside the spotlight.

Another possible direction for increasing the consumption of meat from cattle is the production of organic beef. At the cost of such products may be cheaper, however, as the world experience shows, the costs ultimately appear to be higher compared to the production of traditional products. Prices for organic products tend to be higher, but according to consumer indicators, organic produce has advantages. The demand for such products is gradually being formed, and today it tends to increase mainly at the expense of consumers with high incomes, families with small children, producers of baby food (all these groups of consumers consider a healthy diet as a priority). Taking into account the above, organic beef production is considered by us as a component of quality food security (that is,

by increasing the physical volumes of organic cattle production, simultaneously affecting its quality and safety) [5].

According to statistics, an increase in per capita income leads to less than a proportional increase in food expenditure. Ernst Engel, head of the German State Statistical Service, was the first statistician to analyze the dynamic rows of consumption and bread prices, (for example, Prussia). The work of Ernst Engel "Production and Consumption in Saxony" (1857) was based not on budgets initially. Engel shows how large groups of expenses for food, clothing, housing, etc. when changing income levels change. In the same work, he showed a relative decline in the cost of food with an increase in income - the dependence, which was called "the curve of Engel and the law of Engel.

Demand economists understand the desire and ability of people to buy goods and services. From a mathematical point of view, the elasticity of the function Y = f (x). In relation to X is defined as the limit of the ratio of relative increase in to the relative increase of X, when the last increment approaches 0:

$$Q_{1 = \frac{1}{m} \sum_{j=1}^{m} z_{ij}}$$

Based on this approach, we calculated the coefficients of cattle elasticities for all households, households in large cities and rural areas.

Elasticity in relation to x is the relative magnitude of increment (positive elasticity) or decrease (negative elasticity) in a relative growth x.

The elasticity of income demand is the relative change in the cost of food (or volume of demand) as a reaction to the relative change in consumer income. Elasticity can vary at different levels of income, so the elasticity factor is usually measured in relation to a small (1 percent) change in income. Four situations can be distinguished:

Expense growth is more than proportional to change in income: the ratio is more than one, in such cases, it is said that demand is elastic for income. This circumstance is observed in the consumption of beef, with the exception of urban households with a level of average per capita income of more than 2751 USD / month, and rural - more than 3251 UAH / month. Consequently, for the majority of the population, consumption of beef and veal is limited due to low purchasing power (Table 4).

In the group of urban households with a level of average per capita income of over 5000 UAH / month there is a negative value of the calculated indicator, which is evidence of a reorientation in the consumption of meat and meat products.

In conditions of underproduction of beef and veal, we have sales problems. For Ukrainians, beef is not the main form of meat consumption. In particular, the domestic consumer uses mainly dairy veal or young beef derived from live-stock weighing up to 200 kg. We do not have a culture of consumption of steaks, as in the United States or Europe, where the feta steak is much more expensive than conventional meat. In addition, due to low purchasing power and high retail prices for beef, not all Ukrainians can afford to buy it and prefer cheaper meat (poultry and pork).

Table 4 **The coefficient of elasticity of beef demand depending on the level of income of households, depending on the location.**

Groups per per capita incomes per month, UAH	City		Countryside		In general	
	Actual consumption of kg / shower per month	Coefficient of elasticity	Actual consumption of kg / shower per month	Coefficient of elasticity	Actual consumption of kg / shower per month	Coefficient of elasticity
by 1250	0,92	2,104	0,15	2,549	0,46	3,324
1251-1500	0,65	1,498	0,26	1,664	0,54	2,003
1501-1750	2,01	1,343	0,44	1,414	0,91	1,679
1751-2000	1,91	1,226	0,14	1,254	0,91	1,482
2001-2250	2,28	1,148	0,47	1,118	1,42	1,352
2251-2500	1,94	1,074	0,42	1,015	1,32	1,249
2501-2750	2,35	1,008	0,53	0,915	1,52	1,162
2751-3000	2,88	0,960	0,44	0,825	1,42	1,098
3001-3250	2,73	0,913	1,01	0,734	1,67	1,034
3251-3500	3,00	0,862	0,51	0,647	1,68	0,978
3501-3750	2,86	0,815	0,48	0,564	2,19	0,926
3751-4000	4,30	0,769	1,03	0,466	2,73	0,877
4001-5000	4,65	0,665	0,58	0,252	3,08	0,770
More that 5000	4,84	-0,072	0,74	-0,515	3,18	0,281
Total	2,36	1,028	0,43	1,029	1,33	1,240

Source: Calculated by the author.

For the market of agrarian products, including the beef market, the inelasticity of demand for price and non-price determinants is characteristic. Demand for food products can not grow under the influence of competitive market forces to

the level of growing supply. This situation is typical for countries where self-sufficiency of food products has reached the level of need in them.

Regardless of the location of households, almost all the beef consumed was purchased in retail food markets and retail establishments (Table 5).

According to the research results, a similar phenomenon is observed in households with average per capita income in large cities of 3501-4000 UAH, small cities - 2501- 3500 and 5001-6000 UAH. At the same time, the establishment of a monetary equivalent is not considered appropriate, since all this is based on "informal" ties between the village and the city and between rural households. In this case, it is advisable to mention the peasant professor T. Shanin, who noted: "The informal economy absorbs a number of certain activities that are not focused on automatic profit-taking, and is carried out not so much in order to achieve pre-set goals, but to maintain a certain normal degree of stability, survival, well-being and reproduction "[6].

According to the results of the study, it has been found that for a long period of time there is a situation where a significant part of meat products comes for consumption from relatives for free. This problem of scientific research was rejected by scientists as a "relic of the past, prehistoric". But according to the results of the survey of the activities of private peasant farms, up to 30% of the marketable livestock production is directed by the above-mentioned channel.

It should be emphasized that under present conditions such a form of assistance is perhaps the only opportunity for the formation of a young family. In this case, parents even share the responsibilities of providing young families: some help livestock products, others - special product kits.

The development of cooperation between rural and urban families is possible as follows: residents of the city may incur expenses for the purchase of young animals, which leave for raising and fattening the farmer of a relative peasant, performing one-time work if necessary. Approaches to the practical implementation of this scheme may be different.

Table 5 **Structure of beef consumption in households, depending on location and income level (%)**

| | Big cities | | | | Small cities | | | | villages | | | |
| | | Incl | | | | Incl | | | | Incl | | |
	Total	bought	PF	donated	Total	bought	PF	donated	Total	bought	PF	donated
By 1500	100	100,0	0,0	0,0	100	100,0	0,0	0,0	100	50,0	50	0,0

	Big cities				Small cities				villages			
		Incl				Incl				Incl		
	Total	bought	PF	donated	Total	bought	PF	donated	Total	bought	PF	donated
1501-2000	100	95,0	0,0	5,0	100	100,0	0,0	0,0	100	100,0	0,0	0,0
2001-2500	100	100,0	0,0	0,0	100	100,0	0,0	0,0	100	100,0	0,0	0,0
2501-3000	100	100,0	0,0	0,0	100	90,0	0,0	10	100	80,0	20	0,0
3001-3500	100	100,0	0,0	0,0	100	80,0	0,0	20	100	100,0	0,0	0,0
3501-4000	100	97,1	0,0	2,9	100	100,0	0,0	0,0	100	85,7	14,3	0,0
4001-5000	100	100,0	0,0	0,0	100	100,0	0,0	0,0	100	66,7	33,3	0,0
5001-6000	100	91,2	0,0	8,8	100	88,9	0,0	11,1	100	85,7	14,3	0,0
Over 6000	100	100,0	0,0	0,0	100	88,9	11,1	0,0	100	100,0	100	0,0

Source: Calculated by the author.

According to the data of the State Statistics Service of Ukraine, the largest share in the structure of consumption of rural households with a income level of up to UAH 1,500 per month. takes beef, which is produced in private farms (PF). It should be noted that most of them are in depressed areas and are oriented on self-sufficiency. The owner of a private peasant farm is characterized by an orientation towards self-sufficiency, economic closure. In this case, as a powerful resource is the tradition. The risk to the peasant is permissible only within the limits that do not lead to the destruction of the very existence of the family due to crop failure and other problems. As Chayanov emphasized: "The peasant economy exists with minimal access to the market, only insofar as the surplus product is formed. His main motivation is the production of products for the family ... "[7]

It should be noted also about the relatively high consumption of beef coming from PF in rural households with an income level of more than 3,500,1 UAH / month. In our opinion, this is due not only to the low purchasing power of this category of households or to the lack of products in the trading network, but to the quality. According to numerous observations, the majority of commodity producers violate the technologies of growing farm animals, which negatively reflects on qualitative parameters. As O. Solzhenitsyn notes, characterizing the current quality of the products "Yes, even the food is healthy we have already forgot ... In the 90's we still remembered. But now, such an impression is created that many citizens will not recall soon. Others will never know "[8].

According to the results of statistical observations carried out by the State Statistics Service of Ukraine on the basis of the quarterly household questionnaire, the bulk of beef is used for own consumption and for meeting the needs of other household members who are in friendly and family relationships (Table 6).

Table 6 **Areas of use of beef and veal in rural households** (per 100 households)

Year	Production volumes during the year		Areas of use:					
			consumed, processed, presented		fed cattle, birds		sold, incl. in the redesigned form	
	kg	%	kg	%	kg	%	kg	%
2010	202,94	100	168,56	83,06	0	0	34,38	16,94
2011	173,53	100	156,44	90,15	0	0	17,08	9,85
2012	78,17	100	70,76	90,52	0	0	7,41	9,48
2013	152,31	100	110,67	72,66	0	0	41,63	27,34
2014	144,10	100	141,62	98,28	0	0	2,48	1,72
2015	135,06	100	135,06	100,00	0	0	0	0
2016	109,96	100	106,29	96,66	0	0	3,56	3,34

Source: Calculated by the author.

It should be noted that during 2010-2016 there was a significant decrease (by 37%) in the use of beef for domestic needs. It should be noted that during the investigated period, the growth of the share of own consumption by 13.6 percent points. This circumstance is due primarily to a decrease in the number of cattle kept in private farms and the increase in the number of households holding one head of cattle. According to the State Statistics Service of Ukraine in 2016, 52% of rural households holding one head of cattle. The owner of the PF, which holds one head, is not interested in further feeding the young to high-grade conditions, as there is no equipped space for this [9]. According to the results of the questionnaire survey, in the PF, where one head of cattle is fattened, this period of retention is 3-7 months. That is, the sole owner keeps the young in the period between the cuts clearance because of the lack of places of detention.

According to research results during the year, the seasonality of beef production and consumption is traced. The largest number is produced and accordingly consumed in the I - II quarter. This serves as an indication that the production and slaughter of cattle are carried out for the purpose of self-sufficiency (Table 7).

Table 7 **Production and consumption of beef in rural households, for 2016 kg (per 100 households)**

Quarter	How much has been received over the last three months	How much of the used is used, namely:		
		consumed, recycled is given	cattle, poultry are fed, eggs are used for bird breeding	sold, incl. in the redesigned form
I	36,79	35,57	0,00	1,22
II	34,49	33,34	0,00	1,15
III	23,17	22,40	0,00	0,77
IV	15,50	14,98	0,00	0,52
Total	109,96	106,29	0,00	3,67

Source: Calculated by the author.

It should be noted that most rural households consume calves at a 3-month age. The main factor of this situation is the unfavorable correlation between the price of young cattle and milk. This is the first. Secondly, further retention of livestock requires full feeding with the necessary content of concentrated feed, and this level of nourishment is not ensured by private producers [10]. Typically, grazing on the meadows of cattle, the peasants do not prepare forage for the winter. Thirdly, the lack of sufficient premises for keeping farm animals and storing feed. During 2012-2016, tertiary households in rural households had premises for storing feeds and in less than a half - for livestock and poultry. It should be noted that there is a negative tendency in providing rural households with premises for storage of feed and for keeping livestock and poultry. Thus, during the period under study, the proportion of households with feed storage facilities decreased by 1.3 cents. etc., which have a room for keeping livestock and poultry - by 4.8 pp

Usually the bulk of the coarse fodder is kept in the stool, which leads to certain losses, as well as to reduce their nutrition.

The main reason for the insufficient level of availability of production facilities is the lack of financial resources for the PF for the construction of new and existing ones. This root cause also hinders the development of the PF product orientation. So, only half of rural households have premises for keeping livestock and poultry irrespective of the area of land use.

Reconstruction of commercial premises, which will ensure the expansion of the area of the latter to date, is economically unprofitable due to a violation of the parity of prices for industrial and agricultural products. Due to the lack of facilities for keeping young animals of bovine animals in most owners, it is

located in temporary premises, which makes it possible to grow it only during the spring-summer period of the year.

The maintenance of farm animals in temporary structures, especially in the autumn-winter period, is economically inappropriate due to the low payback of feed.

4   Conclusions

Consumer demand for beef and veal is due to economic, socio-demographic and specific factors. Economic and socio-demographic factors influence the consumer demand for meat products, similar to those inherent in the demand for consumer goods. It is established that the distinctive feature of consumer demand for this product is the attitude to food.

As a result of the study of the peculiarities of the formation of consumer demand in the meat and meat products market, factors that underpin the consumption of meat cattle production are identified. A direct relationship was found between the change in the real disposable income of the population and the per capita consumption of meat cattle breeding products. However, the growth of consumer demand for meat and meat products with the growth of real incomes of the population is satisfied mainly due to poultry meat and pork, and with the decrease in incomes, primarily consumption of red meat is reduced. In addition to the income of the population, the level of consumption of red meat is influenced by the price situation in the meat market of the cattle and the markets for competitive products - pork and poultry meat. Although pork is in the same price segment with beef in the consumer market of Ukraine, demand for it has a lower elasticity at a price due to the traditional consumer preferences of the population and large volumes of supply of fresh and chilled meat on the market. Another influential factor that leads to a decrease in the proportion of beef in the meat consumption fund - a decrease in domestic production, which is due to the reduction of cattle in the country and the lack of development of specialized meat cattle.

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ADVERTISING SKEPTICISM AND MEDIA CREDIBILITY

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Abstract

Advertising remains as preference strategy for marketer to communicate a product, although it is costly. Various media are available in performing advertising, starting from traditional one up to digital media. Television has been primary advertising media since long back. And since the advent of computer and Internet technology, advertising using media such as Internet and Facebook is common. Although advertising through television is more expensive than the last two (2) media, advertising on television is yet salable. On the other hand, it's suspected viewers often do not pay attention to advertising, neither even believe in advertising. Thus the goals of this study were two folds. The first goal was to evaluate the influence of advertising skepticism and media credibility on advertising avoidance. Our second goal was to compare the influence of advertising skepticism and media credibility on advertising avoidance on different media. Questionnaire was deployed in collecting data. Due to the nature of research variables, data collected was analyzed using Structural Equation Modeling. Result showed that overall advertising skepticism and media credibility influence advertising avoidance. The effect is different across media (television, Facebook and Internet). Unexpectedly result shown on this study, i.e. the correlation between media credibility and advertising skepticism is strong and positive.

Keywords: *advertising, skepticism, avoidance, credibility, media, Internet, Facebook, television*

1   Introduction

Advertising is recognized as being the most important integrated marketing communication media since long back. Advertisement is generally accepted as

powerful tool to enhance sale. Previous researches showed that advertising enhance sale through appeals used in the advertisement (Lin, 2011) and positive experience (Keng et al., 2011; Kozinets, 2010), which further affect attitude (Keng et al., 2011; Kozinets, 2010), intention (Acquisti & Spiekermann, 2011; MacKenzie et al., 1986) and finally decision to buy and consume (Sharma, 2013; Sonkusare, 2013). No wonder the company's management is willing to allocate a large budget to fund advertising. Global spending on advertisement media according to Gallo (2017) is expected to reach $2.1 trillion in 2019.

Therefore advertising plays as rhetorical strategies designed to persuade an audience over to a particular way of thinking about persuasion. Advertising should communicate a true meaning and benefit of a product. Advertisement exposure is intended to activate information about the product, including the product-related social identity and its associated focal attribute. But instead, advertisement frequently works like magic to blind consumers, deceptive if it creates, increases or exploits a false belief about product/service performance (Russo, et al., 1981).

Due to some reason, information provided on advertising frequently is incomplete even though irrelevant to the attributes of the product being presented (Russo et al., 1981) and frequently the claims are not acceptable (Obermiller, et al., 2005) or even tricky (Russo et al., 1981). The advertiser likely creates the aspirational advertisement in the hope that the consumer would be interested to purchase and consume the product being advertised. This phenomenon is most probable occurs with advertising practice in Indonesia. Frankly speaking, advertiser in Indonesia is freely to claim irrelevant information related to product advertised. No one ever advertiser is reprimanded due to advertisement content. Therefore it is common to watch an advertisement promote a health product for instance that can solve all health problems. Or another example, in plain view, advertised on many media, an advertising of instant noodle claims its high nutritious, although almost all adult people in Indonesia will agree that instant noodle is harm for health. Due to this fact, the advertisement result is often happen in contrary. Consumer is skeptic towards advertising (Prendergast, Liu and Poon, 2009; Thakor and Goneau-Lessard, 2009). Advertising skepticism is consumer's tendency to distrust and doubt advertising claims (Thakor and Goneau-Lessard, 2009; Obermiller and Spangenberg, 1998).

Advertising skepticism relates not only to advertising content, but also to the medium by which the message is being communicated (such as Prendergast et al., 2009; Marshall and Na, 2003; Diaz, 2002; Gilbert, 1999). Each medium has its own image and personality. Marshall and Na (2003) showed that an advertising on Internet has less credibility than the same message presented in a print medium. As a result of skepticism, consumer frequently avoids the advertising. It is

common to find someone shifting from one channel to another channel when commercial advertising being played during the program on television. Or scroll down without pay any attention when browsing on Internet or Facebook to avoid a commercial advertising. Moreover, the influence of Internet and Facebook is yet diverse (Jensen, 2008).

Up to this date, it is difficult to find a reference on consumer skepticism towards an advertising on Indonesian case. This study will enrich consumer skepticism towards on advertising and media credibility from different culture. The main issue in our knowledge of advertising study in Indonesia is the relationship of advertising skepticism, avoidance and media credibility. We argue that advertising avoidance come up from advertising skepticism and media credibility. Therefore the objective of the study were:

1. To evaluate consumer's skepticism towards advertising and media credibility on advertising avoidance
2. To compare the influence of consumer's skepticism towards advertising and media credibility on advertising avoidance on different media.

2   Data and Methods

Research variables consist of advertising skepticism, media credibility and advertising avoidance. Those three variables are latent in nature so thus questionnaire was deployed as research instrument. Survey was performed to collect data. Participant of survey was student in Gunadarma University on second, third and fourth year. Questionnaire distribution was in two (2) forms. First, questionnaire was distributed through email accompanied with a request to participate, the goal of survey and instruction to fill in the questionnaire. Secondly, questionnaire was administered directly to respondent by gathering them in the same room after class. Participant was informed that there was no correct or wrong answer but true answer. The information provided to avoid student to compare their answer. Questionnaire in closed form, consist of 7 ordinal scales, was developed to measure advertisement skepticism and media credibility. The statements loaded on questionnaire were adopted based on several references.

To measure advertising avoidance on media, we adopted Ketelaar, et al. (2015). In developing questionnaire for media credibility, Kiousis (2001) was adopted. And advertising skepticism was developed based on Prendergast, et al. (2009). Television, Internet and Facebook are advertising medium considered on this study. The idea to choose these three media is to include to the study the advertising medium from traditional one (television) to digital era (Internet and Facebook). Television is yet prefer media communication for advertiser although

it costs very expensive. Internet and Facebook are two communication media that used by almost all Indonesian both as advertiser and viewer. Facebook is very popular as social media for almost all Indonesian.

Prior to questionnaire distribution, validity and reliability tests were performed. For validity and reliability tests, questionnaire was distributed to 30 respondents who were also Gunadarma University student on fourth year. Data collected further analyzed in order to test research model. Considering the nature of data, structural equation modeling (SEM) was deployed to analyze data.

3   Result and Discussion

Of the study respondents, 327 participants completed and returned the questionnaire. Due to incomplete data, we excluded 21 records. The total number of data collected is sufficient to analyze using SEM. For this purpose we make use of Lisrel application. Analysis was started by validation proposed model that presented on Figure 1. Decision is based on goodness of fit statistics. Path diagram of validated model is shown on Figure 2.

Among indexes, Root Mean Square Error Approximation (RMSEA) is a meaningful measure of goodness of fit. RMSEA indicates the close fit of model in relation with degrees of freedom. Value 0.05 or below is very close, 0.08 and below still acceptable, but never used 0.1 and above (Browne and Cuddeck, 1993). As shown on Table 1, RMSEA value is 0.0806. It is evident that data collected is fit to model proposed (Figure 1). We also based our conclusion on other three indexes (Normed Fit Index (NFI), Comparative Fit Index (CFI) and Incremental Fit Index (IF)). The value of those three indexes is range from 0 up to 1. Value close to 1 is a very good fit. As shown on Table 3, those three indexes have values above 0.9. This evident support the conclusion that data is fit to model proposed.

Of particular interest, the influence of advertising skepticism and media credibility on advertising avoidance is different across media. It shows that consumer perceived advertising on those three media differently. The consumer behavior in responding to advertising playing on those three media will be different. Therefore also of interest is to find out the relationship among advertising skepticism, media credibility and advertising avoidance on each media.

To continue with this analysis, we based on Table 2. As shown on Table 3, correlation score between advertising skepticism and advertising avoidance is different among media. The strongest correlation is shown on television. Contrary, the weakest correlation is shown on Internet media. The correlation between advertising skepticism and avoidance on those media is positive. It implies the stronger the skepticism the stronger is the avoidance toward the advertising. Facebook

comes between television and Internet. This result has further strengthened our hypothesis that advertising skepticism influence advertising avoidance.

Generally television viewers in Indonesia avoid the advertising during watching a program. Many people move from one channel to another to avoid advertising. Other viewers perform another activity during advertising being playing. Based on this fact, we may conclude that television viewers in Indonesia are skeptic towards advertising.

The correlation between media credibility and advertising avoidance is very weak on those three media. This result implies that the avoidance of advertising does not depend on the media. Consumer avoids an advertising whether on television, Facebook or Internet.

Interestingly the correlation between media credibility and advertising skepticism is similar on those three media. Further analysis shows that the correlation is strong, that is above 0.5. Unexpectedly, the stronger media credibility the more skepticism consumer toward advertising played on the media. It is needed further research to verify this result. To perform further research, more media can be considered added to the study. The number of respondent is also maybe considered to increase so thus more opinion will be catch. Our surprising continuous with the factor loading between advertising skepticism and avoidance as shown on Table 3. Although the loading is very small, but the sign is negative. It means when the advertising skepticism raise the advertising avoidance is lower. Logically this result is untrue. Therefore it require to further research by adding more media and more respondents.

4   Conclusion

Various media are available in performing advertising, starting from traditional one up to digital media. Television has been primary advertising media since long back. And since the advent of computer and Internet technology, advertising using media such as Internet and Facebook is common. Although advertising through television is more expensive than the last two media, advertising on television is yet salable. On the other hand, it's suspected viewers often do not pay attention to advertising, neither even believe in advertising. The goals of this study were two folds. The first goal was to evaluate the influence of advertising skepticism and media credibility on advertising avoidance. Our second goal was to compare the influence of advertising skepticism and media credibility on advertising avoidance on different media. Result showed that overall advertising skepticism and media credibility influence advertising avoidance. The effect is different across media (television, Facebook and Internet). Unexpectedly result

shown on this study, i.e. the correlation between media credibility and advertising skepticism is strong and positive.

Acknowledgements

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Appendix

Figure 1 **Research model**
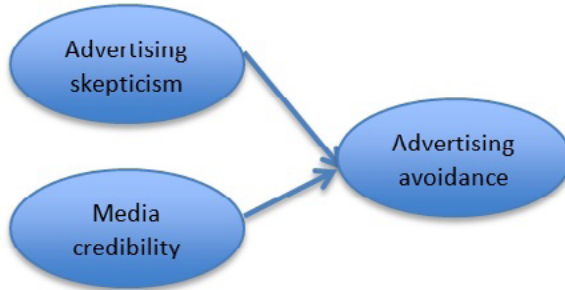
Source: Own research.

Table 1 **Global goodness of fit statistic**

No	Index	Value
	Chi Square (p-value)	1273.378 (0.0000)
	Root Mean Square Error of Approximation	0.0806
	Normed Fit Index (NFI)	0.9
	Comparative Fit Index (CFI)	0.931
	Incremental Fit Index (IFI)	0.931

Source: Own research.

Table 2 **Correlation between variable within group**

No	Variable	Advertising avoidance			Media credibility		
		Television	Facebook	Internet	Television	Facebook	Internet
1.	Advertising skepticism	0.130	0.117	0.049	0.530	0.530	0.530
2.	Media credibility	0.027	0.056	0.097			

Table 3 **Factor loading between latent variable within group (standardize solution)**

No	Variable		Advertising avoidance		
			Television	Facebook	Internet
3.	Advertising skepticism		-0.058	-0.008	-0.003
4.	Media credibility		0.161	0.121	0.098

Source: Own research.

Figure 2 **Diagram path of validated model**
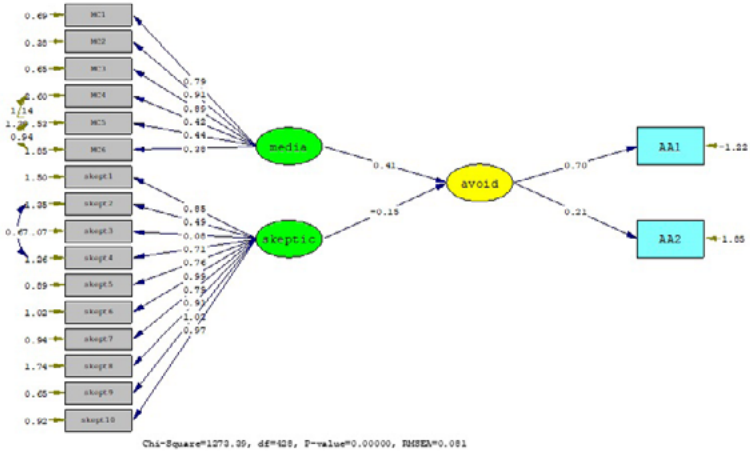
Source: Own research.

FACTORS INFLUENCING SLOVAK CONSUMER´S ACTUAL BUYING BEHAVIOR TOWARDS FRESH VEGETABLE

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Abstract

The main objective of the submitted paper was to identify factors influencing the behaviour of Slovak consumers on the market with fresh vegetable. Primary data were obtained through a questionnaire survey, which was carried out on a randomly selected sample of 390 respondents in Slovakia. The questionnaire survey was conducted online in November and December 2017. The obtained data were analysed by using Excel program as well as the statistical programming language - R. For a deeper analysis of the collected data, we formulated several scientific assumptions. We verified their accuracy with the Chi-Square Test of Independence, Cramer´s V Coefficient, Fisher´s Test and Kruskal-Wallis Test. Based on our research we the conclusion is that consumers while buying fresh vegetable are most influenced by the freshness of vegetable, taste, maturity, quality as well as the general appearance of vegetable. Moreover, we found out that there existsdependence between attributes, which are the most important to respond to the purchase of vegetable (price, colour, taste, shape, size, smell, maturity, general appearance) and what is most attracted to the vegetable counter. Based on our research, we also proved dependence between the purchase of vegetable and respondent´s place of residence as well as dependence between consumers´ attitude towards organic products and preferences of origin. Finally, following the significance of selected factors, we examined the dependence of their perceptions on the socio-demographic characteristics of the respondents.

1   Introduction

The current modern consumer has other preferences, other eating habits, and lifestyle as it had been in the past decades. He is more interested in healthy eating, consumes more vegetable, and in addition, he is more interested in food origin and quality. According to Kádeková, Récky, Nagyová, Košičiarová, and Holienčinová (2017), the consumption of organic farming products is also increasing for Slovak consumers. Ragaert, Verbeke, Devlieghere, and Debever (2004); Dixon, Mullins, Wakefield, and Hill (2004); Rekhy and McConchie (2014); Pollard, Greenwood, Kirk, and Cade (2001); Carrroll, Samek, and Zepeda (2018) state that vegetable, due to its protective function against cancer, obesity, cardiovascular diseases as well as other chronic degenerative diseases, has a significant impact on the health of each of us. Consuming vegetable and a diet, which is rich in the vegetable is important for achieving and keeping good health (Geeremos, Verbeke & Kenhove, 2008). Abadias, Usall, Anguera, Solsona, and Viñas (2008) add that fresh vegetable is part of basic components of human food, and there is considerable evidence of the health and nutritional benefits of eating a vegetable. As state Storey and Anderson (2018), at least three servings of vegetable every day are recommended. Menozzi, Sogari, and Mora (2017) report that eating a vegetable is one of several ways to improve the worsening trend of healthy eating. According to Kearney (2008), the world's biggest problem is the inadequate consumption of vegetable even though the production of vegetable has been steadily rising in recent years. De Droog, Van Nee, Govers, and Buijzen (2017) state that current consumption of vegetable by children in most European countries does not correspond to the recommended daily allowances. Cox and Poelman (2015) state that the segmentation of vegetable consumers in the past included: taste preferences, lifestyle, consumer behaviour, gender, vegetable consumption, household characteristics, place of residence, children and children´s age, education, occupation, and genetic variation in taste. Bongoni, Steenbekkers, Verkerk, Boekel, and Dekker (2013) argue that consumer's behaviour in relation to vegetable consumption can be influenced by various factors such as habits, sensory preferences, situational factors and health benefits. According to Saba, Moneta, Peparaio, Sinesio, Vassallo, and Paoletti (2018); Perez-Cueto et al. (2017); Van Stokkom, Blok, Van Kooten, De Graaf, and Stieger (2018); Paluchová, Berčík, and Horská (2017); Paluchová,

Berčík, and Neomániová (2016) among the important factors of consumer deci-sion-making, not only about vegetable are sensory attributes such as appearance, freshness, odour, smell, texture, taste. According to Loebnitz and Grunert (2018), the shape is a key criterion for the definition of vegetable in terms of appearance, but also other visual criteria such as colour or size, to determine their impact on perceived risk to consumers. Moser, Raffaelli, and Thilmany-McFadden (2011) report that in most cases, the most important factor of consumer decision-mak-ing is the country of origin, and according to Sillani and Nassivera (2015) there is also the price included. Farragher, Wang, and Worsley (2016) in their study state that the consumption of vegetable affects demographic characteristics, nu-tritional knowledge, personal values and factors of personality. According to Dos Santos, Nogueira, Alvarez, and Perez-Cueta (2017), other factors include religion, pleasure, individual mood, and personal preferences. According to Ma, Blake, Barnes, Bell, and Liese (2018), the selection of vegetable is one of the important decision-making factors and it also includes the psychological aspects that ex-plain the consumption of vegetable and the motivation of consumer's behaviour. According to the authors, women generally have a tendency to consume more vegetable than men. In addition, Baselice, Calantuoni, Lass, Nardone, and Stasi (2017); Sinesio, Saba, Peparaio, Civitelli, Paoletti, and Moneta (2018) consider social interactions, time points, advertising, social and physical surroundings as important factors in the selection and consumption of vegetable. An impor-tant role in product decision-making and choice also plays consumer emotions which, according to Spinelli, Masi, Zoboli, Prescott, and Monteleone (2015), can be attributed to the intrinsic sensory characteristics of products, packaging, and brands. According to Koutsimanis, Getter, Behe, Harte, and Almenar (2012), the information stated currently on the packaging of fresh vegetable, which signifi-cantly affects consumer decision-making, is inadequate. Therefore, it is important to understand consumer perception, so that appropriate packaging of products can be designed. Increased consumption of vegetable according to Elsbernd, Re-iscks, Mann, Redden, Mykerezi, and Vickers (2016); Keller, Motter, Motter, and Schwarzer (2018) is possible through behavioural economics strategies. These strategies use natural human behaviour to increase the number of consumers, who choose and consume healthier groceries.

2   Data and Methods

Primary data from our research were collected based on a questionnaire survey conducted in November and December 2017. 390 respondents from all over the Slovak Republic participated in the questionnaire survey. Respondents were

randomly selected by consumers of vegetable. The main objective of our research was to identify factors influencing the behaviour of Slovak consumers on the market with fresh vegetable. All obtained data were analysed and evaluated by using Excel and the statistical programming language - R. We used selected statistical methods for deeper data analysis. Chi-square Test of Independence we used to find out the dependence between the examined variables. We used Cramer´s V Coefficient to determine the extent of the existing dependence between the variables. We also used the Fisher´s Test to investigate the dependence in cases where Chi-square Test of Independence is inadequate with respect to the size of the selected sample. Kruskal-Wallis Test was used to examine dependence between the significance of selected factors and their perceptions according to the socio-demographic characteristics of the respondents. Moreover, we have formulated several scientific assumptions, which were verified by using selected statistical methods.

Assumption 1: We assume dependence between the purchase of vegetable and respondent´s place of residence.

Assumption 2: We assume dependence between the frequency of buying vegetable and gender of respondents.

Assumption 3: We assume dependence between attributes, which are the most important to a response of vegetable purchasing (price, colour, taste, shape, size, smell, maturity, general appearance) and what is most attracted to the vegetable counter.

Assumption 4: We assume dependence between consumers´ attitude towards organic products and preferences of origin.

Assumption 5: We assume influence of consumers´ education on the perception of vegetable taste and health aspect.

Assumption 6: We assume influence of consumers´ income on the perception of vegetable taste, advertising, product discount, health aspect and vegetable freshness.

Assumption 7: We assume influence of consumers´ place of residence on the perception of vegetable taste, advertising and vegetable freshness.

3   Results and Discussion

Based on the results of the questionnaire survey, we can characterize a typical respondent as a woman aged 19-25, a student with the highest level of education at a secondary school with A level, living in one household with parents and siblings, with a monthly income of up to 400 €, and comes from Nitra region while living in the countryside. The detailed structure of the sample is shown in Figure 1.

Figure 1 **Characteristics of respondents**

Gender	%	Age structure	%	Education	%	Economic activity	%
man	34.0	up to 18 years	4.3	primary education	4.9	student	48.0
women	66.0	19 – 25 years	53.1	secondary without A level	7.7	employed	30.0
		26 – 35 years	11.1	secondary with A level	66.6	unemployed	1.4
		36 – 45 years	8.6	higher education	20.8	self-employed	2.3
		46 – 55 years	6.6			entrepreneur	2.3
		56 – 65 years	7.1			retiree	15.1
		over 65 years	9.1			maternity leave	0.9
Income	**%**	**Place of residence**	**%**	**Household structure**	**%**	**Region**	**%**
up to 400 €	45.7	city	51.4	I live alone	8.9	Bratislava	3.1
401 – 600 €	18.9	counterside	48.6	I live with my parents	24.6	Trnava Nitra	23.1 50.9
601 – 800 €	13.4			I live with my parents and siblings	30.0	Trenčín Žilina	7.7 2.0
801 – 1000 €	7.7			I live with my wife/husband or partner without children	19.7	Banská Bystrica Prešov	9.1 3.4
over 1000 €	14.3			I live with my wife/husband or partner with children	16.9	Košice	0.6

Source: Own processing, 2018.

Respondents were asked how often they consume vegetable and when they consume vegetable the most during the day. In the following figure (Figure 2) we can see the frequency of vegetable consumption by respondent gender. Based on the results, we can say that most respondents consume vegetable several times

a week (53.78% of men and 46.09% of women). Every day, vegetable consume 25.21% of men and 39.57% of women. The minority of respondents said that they consume vegetable only once a month (0.84% of men and 0% of women). Most respondents (39.4%) consume vegetable for lunch and 29.7% for breakfast. We also found out that respondents consume vegetable at least between lunch and dinner (2.5%) and between breakfast and lunch (6.2%).

Figure 2 **Frequency of vegetable consumption by gender**
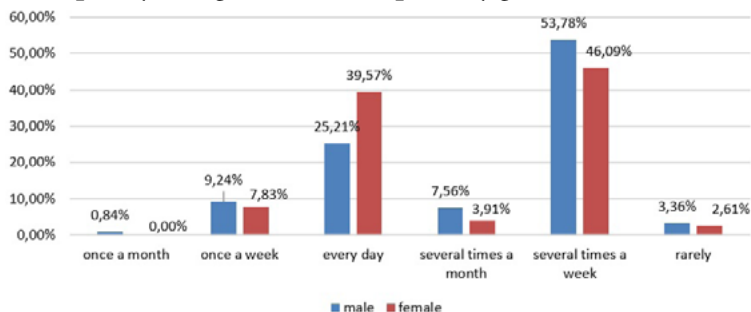
Source: Own processing, 2018.

In the following figure (Figure 3), we can see whether respondents buy vegetable and whether this is influenced by the respondent´s place of residence. Based on the results, we can state that vegetable is regularly purchased by respondents coming from the city (41.34%), while these respondents do not grow vegetable in the garden at all (12.29%). Compared to respondents, who come from the countryside, we can see that they prefer vegetable from their own garden (29.41%) and only 24.12% of them buy vegetable regularly. In addition, we have formulated the assumption and considered whether there is a proven dependence between the purchase of vegetable and respondent´s place of residence. Based on the Chisquare Test of Independence, we proved a dependence with P-value 0.0001<0.05. The next step was to verify the degree of dependence. Using the Cramer´s V Coefficient we can conclude that the dependence can be considered as weak (0.2409).

Figure 3 **Purchase of vegetable depending on the respondent´s place of residence**
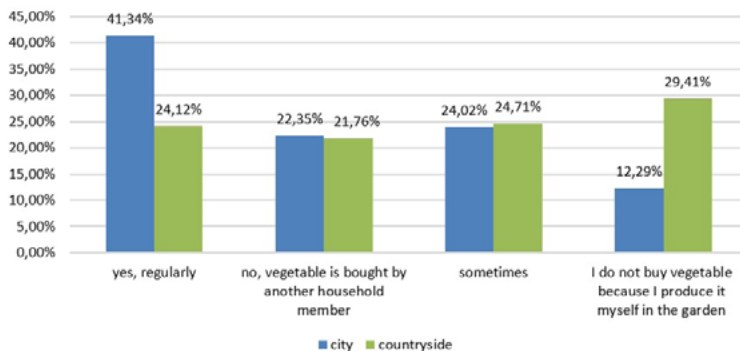
Source: Own processing, 2018.

In our questionnaire survey, we have investigated how often respondents buy vegetable. Respondents buy vegetable the most several times a week (42.37% of men and 56.03% of women). The minority of respondents buy vegetables rarely (1.69% of men, 3.55% of women). We have formulated the scientific assumption, in which we wanted to demonstrate the dependence between the frequency of buying vegetable and the respondent´s gender. We used the Chi-square Test of Independence, with P-value 0.1939<0.05, confirming a zero hypothesis, and thus we did not find any dependence between the variables examined.

Regarding the factors that respondents are influenced by when they buy vegetable, in Figure 4 we presented complete results. Respondents on the 10 - point scale rated 26 factors that influence them when buying vegetable and ranging from 1 to 10 (1 - no impact, 10 - the maximum impact) reported that influenced them more or less. Based on the questionnaire, survey we found out that the respondents are most influenced by vegetable freshness (7.91 points), vegetable maturity (7.78 points), general appearance (7.59 points) and quality (7.49). They are at least influenced by the advertising of vegetable (2.47 points), brand (3.71) and BIO quality of vegetables (4.45). The price was rated by the respondents as a factor that has an average impact on the purchase of vegetable (5.77 points). The country of origin was also among the factors that were rated at a similar level as the price. As a result, consumers are primarily interested in quality factors than how expensive the vegetable is.

Figure 4 **Factors influencing consumer´s buying behaviour towards vegetable**

Source: Own processing, 2018.

We were also interested in, what specifically respondents attract, besides the need to buy vegetable, to the counter with vegetable the most (Figure 13). We found out that it is an especially fresh-looking vegetable (51.2%). Only 1% of respondents are interested in advertising of vegetable and only 2% of respondents are encouraged to eat a vegetable on the counter. 25.9% of respondents said they always buy vegetable depending on need. Moreover, we formulated scientific assumption and the purpose was to examine whether there exist a certain dependence between attributes, which are the most important to responding to the vegetable purchase (price, colour, taste, shape, size, smell, maturity, general appearance) and what is most attracted to the vegetable counter (freshly looking vegetable, discount, advertising, tasting, arrangement and way of vegetable storing on the counter, lighting of the counter with vegetable). Based on the results of Chi-square Test of Independence, we found out that the dependence between examined variables exists (P-value 0.0059<0.05). The next step was to verify the degree of dependence by the Cramer´s V Coefficient. We can conclude that the dependence between the examined variables is weak (0.2391).

Consumption of organic products is currently very popular and the number of consumers of these products is increasing steadily (Kretter & Kádeková, 2013). Regarding Kádeková et al. (2017), more than a third of consumers buy organic fruit and vegetable. The following graph (Figure 5) shows that consumers who prefer home-grown vegetable buy organic products only a few times a year (58.50%), and always these products are bought only by 4.76% of respondents.

Respondents, who prefer imported vegetable, buy it occasionally (75%). In both cases, the organic vegetable is not trusted by a quarter of consumers. The results of our research, together with the results of the Kádeková et al. (2017) point out the fact that consumers are inclined to buy organic products, but, occasionally. Regarding Figure 5, we can see dependence between consumers´ attitude towards organic products and preferences of origin. This is confirmed by using Fisher´s Test with P-value 0.0249<0.05.

Figure 5 **Influence of the consumers´ attitude towards organic products on preferences of origin**
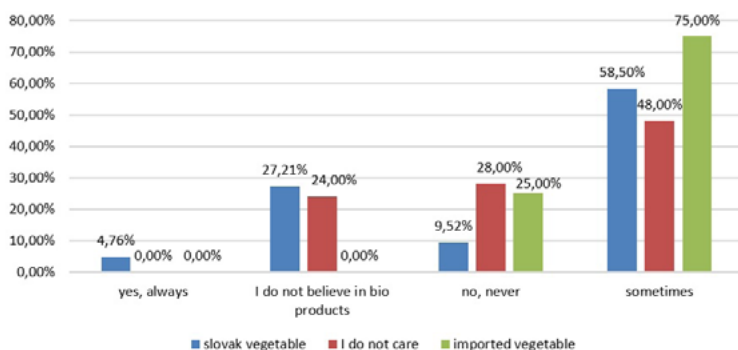
Source: Own processing, 2018.

Following the significance of selected factors, we examined the dependence of their perceptions on the socio-demographic characteristics of the respondents (education, income, place of residence). Applying the Kruskal-Wallis Test, we state that the following factors are influenced by education: the taste of vegetable (P-value 0.0459) and health aspect (P-value 0.0161). The respondent´s income is influenced by the perception of the importance of taste of vegetable (P-value 0,0027), advertising (P-value 0,0338), product discounts (P-value 0,0402), health aspect (P-value 0,0049) and freshness of vegetable (P-value 0,0435). Regarding the respondent´s place of residence, its influence was not proven by any factor.

4   Conclusion

The main objective of this article was to identify factors influencing the behaviour of Slovak consumers on the market with fresh vegetable. Based on the obtained data through the questionnaire survey, we found that most respondents consume vegetable several times a week (53.78% of men and 46.09% of women). Every

day, a vegetable is consumed only by 25.21% of men and 39.57% of women. Most respondents (39.4%) consume vegetable for lunch and at least between lunch and dinner (2.5%). The vegetable is regularly purchased by respondents coming from the city (41.34%), while those respondents are not likely to grow vegetable in the yard (12.29%). Respondents coming from countryside tend to produce vegetable in the yard (29.41%) and only 24.12% of them buy vegetable regularly. In addition, we have found that there is a proven dependence between the purchase of vegetable and respondent´s place of residence. In our questionnaire survey, we examined how often respondents buy vegetable. Respondents buy vegetable the most several times a week (42.37% of men and 56.03% of women). Regarding the factors that influenced respondents when buying vegetable, we found out that respondents are most influenced by vegetable freshness, vegetable maturity, general appearance and quality when buying vegetable. At least, they are influenced by advertising of vegetable, brand, and by organic vegetable. We were also interested in, what specifically respondents attract, besides the need to buy vegetables, to the counter with vegetables the most. Based on the results, we can state that for more than 50% of respondents it is especially freshly-looking vegetable. Only 1% of respondents are interested in advertising of vegetable. Moreover, we have proven weakly dependence between attributes which are the most important to responding to the purchase of vegetable (price, colour, taste, shape, size, smell, maturity, general appearance) and what is most attracted to the vegetable counter (freshly looking vegetable, discount, advertising, tasting, arrangement and the way of vegetable storing on the counter, lighting of the counter with vegetable). The research results also point to the fact that consumers are positively inclined to buy organic products, but buy them only rarely. We also examined dependence between consumers´ attitude towards organic products and preferences of origin. Based on our research, we also found out that the perception of some selected factors influencing the purchase of vegetable depends on socio-demographic indicators (income, education, and respondent's place of residence).

Acknowledgements

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PREFERENCES OF CATTLE BREEDERS ON THE POLISH INDUSTRIAL FEED MARKET TOWARDS DOMESTIC OR FOREIGN FEED

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Abstract

The aim of the paper is to divide cattle breeders in groups regarding their preference towards domestic or foreign industrial feed, to determine importance of some characteristics when buying feed and to determine impact of sociodemographic characteristics on cattle breeders preferences towards domestic or foreign industrial feed. Furthermore, the goal is to determine knowledge about industrial feed market in Poland among cattle breeders and the impact of sociodemographic characteristics and preference towards domestic or foreign industrial feed on their knowledge. The main source of data used was primary information from the authors' own study (PAPI method, 200 cattle breeders). Based on the conducted research, it can be concluded that the majority of cattle breeders on the Polish market has the medium level of ethnocentricity (47%). Another group consists of purchasers declaring the high level of ethnocentrism. The purchasers with the low level of ethnocentricity are the smallest group. When choosing feed suppliers, farmers usually take the price, good location, and favorable payment terms into account. The level of ethnocentrism depend on age and education of the purchasers. They were the most common among people with a basic vocational education and breeders over 55 years old. No statistical correlation between the ethnocentrism level and the gender of the respondents was found. Cattle breeders believe that feed from foreign companies is more innovative, accessible, and is of better quality.

Keywords: *cattle breeder, ethnocentrism, industrial feed market, preferences*

JEL Classification: *L22, M31,R31*

1   Introduction

The industrial feed market is one of the most dynamically developing production means markets in Poland. According to the Central Statistical Office of Poland, the 2016 industrial feed production amounted to 10.9 million tonnes compared to 9.3 million tonnes in 2015. The sales amounted to 9.80 million tonnes compared to 9.12 million tonnes in the previous year. The production of industrial feed for poultry grew by 10%, for pig – by 6%, and for cattle – by 1%. The quantitative structure of industrial feeds for cattle was dominated by complementary feed compounds (89%). The percentage share of milk replacers was 5% and mineral feed compounds - 4%. The proportion of complete feed compounds was 2%, and premixtures (calculated per 1%) - 1.5% (GUS, 2017).

In 2016, the economic and financial of companies obliged to produce financial statements improved compared to previous years. Due to the low prices of raw materials for feed, profitability indicators and generated profits were high throughout the 2016/2017 season (Rynek pasz, 2017).

The industrial feed market in Poland is highly concentrated. The leaders on the analyzed market of agricultural production means are: Cargill, De Heus, Sano and Wipasz (Rynkometr, 2018). It is characterised by a continuously changing structure of supply. Foreign feed companies intensify their marketing activities in Poland and those already operating are subject to diverse transformations. The effect of the process of internationalisation of the feed sector is the increase of competitiveness between national and foreign companies (Piwowar, 2013; Ploplis, 2017; Rynek pasz, 2017). Competition in such a dynamic and internationalised environment requires understanding diverse attitudes of purchasers towards national and foreign feed companies. The preferences towards domestic or foreign products offered on the market often have a significant impact on their purchase decisions and, in consequence, on the success of a given institution. These preferences continuously change over time. (Hat and Smyczek, 2016; Guo & Zhou, 2017; Michailova et al., 2017).

The preferences towards domestic or foreign industrial feed on the industrial feed market are still not researched. Researchers have been focusing mostly on consumer goods (Godey et al., 2012; Claret et al., 2012; Lee et al., 2013, Lagerkvist et al., 2014) and services market (Lin & Chen, 2006; Chaney & Gamble, 2008; Ferguson et al., 2008). The market of production means, including the industrial feed market, its meaning and specificity, which often needs a separate marketing approach, has not been discussed much. It is due mostly to a smaller number of entities on this market, lower number of transactions, and different trade in goods structure (prevalence of direct trade) (Wojciechowski, 2003).

Thus, the aim of the paper is to divide cattle breeders in groups regarding their preference towards domestic or foreign industrial feed, to determine importance of some characteristics when buying feed and to determine impact of sociodemographic characteristics on cattle breeders preferences towards domestic or foreign industrial feed. Furthermore, the goal is to determine knowledge about industrial feed market in Poland among cattle breeders and the impact of sociodemographic characteristics and preference towards domestic or foreign industrial feed on their knowledge. Apart from their cognitive dimension, the information obtained may be used to design marketing actions in feed businesses effectively and reduce the vulnerability of their position on the Polish feed market.

2 Data and Methods

The main source of data used was primary information from authors' own study. The research was conducted in 2017 using the PAPI method on a group of 200 cattle breeders from the Małopolska Province. In 2013, the number of bovine holdings in the analyzed province was 42,200 (Urząd Statystyczny, 2014). Purposive sampling was used. To estimate the minimal sample size, the following formula was used (Szreder, 2004):

$$z_{ij} = \frac{x_{ij} - \min\limits_{i} x_{ij}}{\max\limits_{i} x_{ij} - \min\limits_{i} x_{ij}}$$

where: N – population size,
d – statistical error,
$z_{\alpha}/2$ – the value of random variable Z of normal standard distribution.

The maximal value of the statistical error of the result was assumed as 5%. The necessary minimal sample size was determined as 101 persons. 210 breeders participated in the study. After excluding inconsistent and incorrectly filled questionnaires, data from 200 questionnaires was further analyzed.

The questionnaire was divided into two parts and consisted of 21 questions in total. Most of the questions were closed, only two were open. The first part contained questions regarding observable elements of the consumers' ethnocentrism on the industrial feed market (cognitive, affective, and behavioral components). To measure the level of ethnocentrism, was used the CETSCALE. The minimum possible score was 17 points, maximum of 119. Three, roughly equal length levels of ethnocentrism of respondents have been established: low (17-51 points), medium (52-85 points) and high ethnocentricity (86-119 points). The second part contained sociodemographic variables of respondents.

30% of the respondents were women and 70% were men. Only adult persons (over 18 years of age) participated in the study. Over 50% of the respondents were between 18 and 35 years old. The high share of young farmers in the sample results that they were more willing to participate in research. The two remaining groups of participants were middle-aged (23%) and elderly (23%). The majority of the studied group declared secondary education. Persons with basic vocational education constituted 25% of the studied group. The remaining respondents declared tertiary education.

Distinguishing the criteria based on which a person is likely to consider a given product/brand domestic or foreign is an important issue. In case of the industrial feed market, the correct criterion is the country of origin of the dominant share of equity capital (Figiel, 2004).

Two groups of factors have a direct impact on the level of consumers' ethnocentrism: psychosocial (patriotism, conservatism, individualism, etc.) and demographical (age, gender, education, place of residence). Selected demographical factors were included in the study. Based on the literature, it was assumed that the results obtained so far within the psychosocial determinants were coherent and uniform (Figiel, 2004), so there is no need to take them into consideration. However, it is worth remembering that the behaviors of purchasers on the market change over time, so these factors should be included in future research.

The statistical analysis of the studied material encompassed aggregate statistical indicators as well as the non-parametric test „chi square" (χ^2) allowing for an assessment of the significance of relationship between variables if at least one of them is non-measurable. All hypotheses were verified on the significance level α = 0.05.

Apart from the primary sources they also used secondary sources which encompassed both domestic as well as foreign literature. Results of studies were presented in a descriptive, tabular and graphic form.

3   Results and Discussion

The conducted research shows (Figure 1) that almost 40% of cattle breeders consciously choose feed manufactured by companies with the prevalence of Polish capital (the high ethnocentricity). Almost every second respondent had the medium level of ethnocentricity. 15% of the participants declared that they prefer foreign companies' feeds (the low level of ethnocentricity).

Figure 1 **Levels of ethnocentrism of respondents (%)**
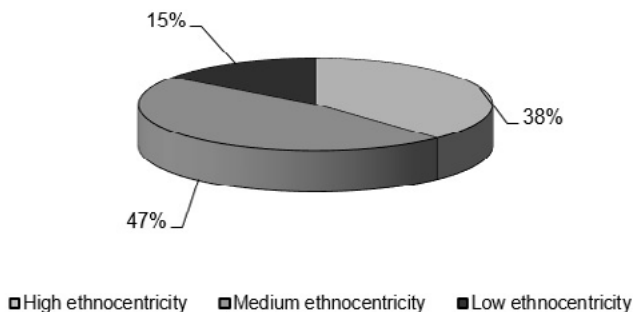
Breeders with the medium level of ethnocentricity pointed to a range of different factors they take into account when buying feed. The most important, decisive one was low price (31% of answers). The research results are consistent with the results obtained by other researchers (Staszczak, 2014; Bórawski, 2016). Good location of the point of sale was also important (22%). The respondents also mentioned favorable payment terms (sale in instalments and deferred payment term), as well as the availability of other products needed in an agricultural holding in the point of sales (13% each). Feed availability was also an important factor (11%), indicated mostly by dairy cattle breeders. Only fixed and balanced feed composition guarantees the high productivity of dairy cattle. All, in particular sudden changes in feed rations may lead to metabolic diseases, and a decrease in productivity and milk quality. Every tenth respondent indicated the possibility of the direct delivery of the feed to the holding included in the price. It would allow the farmers to save time and reduce transport costs (Seremak-Bulge et al., 2015).

As mentioned above, 15% of breeders buy feed manufactured by companies in which foreign capital prevails. In their opinion, this feed is of better quality (54%) than Polish companies' products, but are more expensive (46%). The obtained results confirm the results of other research (Pietrzko, 2017). Almost 40% of the respondents believe that products used in cattle nutrition manufactured by foreign companies are more innovative than the Polish ones. One in four participants said that there were no problems with the purchase or timely delivery of feed from foreign companies, whereas such issues were not uncommon in the case of Polish manufacturers. Every twelfth breeder stated that foreign feed is often cheaper than Polish feed.

Preferences towards domestic or foreign industrial feed is determined by multiple factors, one of which is gender (Szromnik & Wolanin-Jarosz, 2013; Schnettler

et al., 2017). The high level of ethnocentricity were presented by men and women equally ($\chi2$=2.3; df=2). Research shows that for 33% of women the fact that the manufacturer is a Polish company plays a decisive role and for men the result was only 3 pp lower (Table 1). The segment of low ethnocentricity is primarily made up of men (60%). These results are consistent with those of earlier studies (Garcia-Gallego & Chamorro Mera, 2015).

Table 1 **Respondents' level of ethnocentricity by gender, age and education (%)**

Specification		Respondents' level of ethnocentricity			Total
		High	Medium	Low	
Gender	Women	33	51	16	100%
	Men	30	60	10	100%
Age	18-35 years	31	42	25	100%
	36-55 years	30	54	16	100%
	>55	60	24	16	100%
Education	Vocational	50	34	16	100%
	Secondary	40	44	16	100%
	University	32	55	13	100%

Source: Own research, n = 200.

The statistical analysis conducted shows that the factor determining the level of ethnocentrism among breeders on the industrial feed market is age (χ^2 = 83.4; df=2). The highest level of ethnocentrism was observed in the oldest respondents. Two in three people in this group declared that they consciously choose feed manufactured by Polish companies. The lowest level of ethnocentrism was noted in the youngest group. The respondents from this age group chose feed from foreign manufacturers most often in comparison with other groups. The research results are consistent with the results obtained by other researchers and demonstrate that the level of ethnocentrism increases with age (Watson & Wright 2000, Javalgi et al., 2005; Shankarmahesh, 2006; Rašković et al., 2016).

Another factor determining the level of ethnocentrism is education. According to the research, people with basic vocational education were the most ethnocentric ($\chi2$=36.3; df=4). Every second respondent from this group bought feed from Polish manufacturers. The share of persons with a secondary education representing the high level of ethnocentricity was 10 pp lower than in the case of respondents with a basic vocational education. People who completed a higher education were the least likely to pay attention to whether the feed manufacturer is a Polish or foreign company. The obtained results confirm the results of other

research identifying the factors determining the level of ethnocentrism, which shows that the ethnocentrism level decreases with the increase of purchasers' education level (Sharma et al., 1995; Luque et al., 2004; Matysik-Pejas, 2009; Garcia-Gallego & Chamorro Mera, 2015).

An important issue in the process of identifying of ethnocentrism level is the perception of a feed manufacturer as a Polish or foreign company. Given the continuous changes and fusions on the industrial feed market, it is difficult for an ordinary purchaser to distinguish between Polish and foreign companies. In the study, the breeders were asked to indicate Polish and foreign companies in a group of industrial feed manufacturers. They identified the companies in terms of prevailing capital without difficulties. The recognisability of the two largest Polish feed manufacturers was 92% (Ekoplon SA) and 70% (Wipasz SA) The recognisability of foreign feed companies was also high (Cargill — 92%, Sano — 92%, Josera — 85%). The respondents had a problem with recognising two Polish companies: Dolfos — 61%, and Golpasz — 53%).

The level of feed manufacturer recognisability in terms of capital owner is determined by multiple factors. One of them is the gender of purchasers ($\chi 2$=78.7; df=2). Men were characterized by a significantly higher level of knowledge on the subject. 60% of them identified all the feed brands correctly, whereas only 20% of the women were able to do so (Table 2). Taking the age of breeders into account, it can be stated that respondents over 35 years of age were the best in identifying brands ($\chi 2$=90.2; df=4). The level of actual recognisability also grew with the level of education of the respondents ($\chi 2$=94.2; df=4). A vast majority of respondents who completed a higher education was characterized by a high degree of brand identification (80%). In breeders with a secondary education the level was 40% and in breeders with basic vocational education — only 25%.

Table 2 **Level of the actual recognisability by gender, age and education (%)**

Specification		Level of the actual recognisability			Total
		Low	Medium	High	
Gender	**Women**	25	55	20	100%
	Men	15	25	60	100%
Age	**18-35 years**	16	39	45	100%
	36-55 years	16	24	60	100%
	>55	16	39	45	100%

Specification		Level of the actual recognisability			Total
		Low	Medium	High	
Education	Vocational	15	60	25	100%
	Secondary	15	45	40	100%
	University	15	5	80	100%

Source: Own research, n = 200.

According to B. Sternquist and S. McLain (1991), when characterizing ethnocentrism, the relation between the intensiveness of ethnocentrism and purchasers' awareness of the actual origins of products is of significance. Often, despite their ethnocentric tendencies, purchasers are not aware of the country of origin of the purchased products. The awareness of the origin of the product is necessary in order to choose a domestic product consciously, so the phenomenon explains the discrepancies between the declarations and actual behaviour on the market.

Table 3 **Level of the actual recognisability of the country of origin of feed companies in terms of kinds of respondents' level of ethnocentricity (%)**

Respondents' level of ethnocentricity	Level of the actual recognisability			Total
	Low	Medium	High	
High	20%	52%	28%	100%
Medium	11%	22%	67%	100%
Low	14%	57%	29%	100%

Source: Own research, n = 200.

According to the conducted analysis (Table 3), the phenomenon was also observed in the studied group. Persons with the medium level of ethnocentricity had the highest level of actual recognisability of feed brand owners. Almost 70% of respondents from this group correctly distinguished Polish and foreign feed companies operating on the Polish market. Respondents with the highest ethnocentrism level had the highest number of incorrect answers.

Considering the discrepancies between the intensiveness of ethnocentrism and the purchasers' awareness regarding the actual country of origin of the feed, the breeders were asked the following question: "Do you feel the need to learn which companies manufacturing industrial feed are Polish and which are foreign?" Based on their declarations, it can be concluded that almost 50% of the respondents were not interested in this information. These were mostly participants representing the medium level of ethnocentricity. Almost 1/3 of farmers

look for such information. The remaining participants were not able to express their opinion. These results are consistent with those of earlier studies (Czy polscy konsumenci…, 2012).

4 Conclusion

The behaviour of contemporary production means purchasers is the result of global economy globalisation and internationalization processes. The inflow of a growing number of foreign companies to the Polish industrial feed market increases competitiveness on the internal market and affects the operations of domestic feed plants and business. Therefore, it is important to consider the preferences of feed purchasers in view of these changes and their ethnocentric reaction to the presence of numerous foreign institutes in particular.

Based on the conducted research, it can be concluded that the majority of cattle breeders on the Polish market has the medium level of ethnocentricity (47%). Another group consists of purchasers declaring ethnocentrism. The purchasers with the low level of ethnocentricity are the smallest group. When choosing feed suppliers, farmers usually take the price, good location, and favorable payment terms into account.

The level of ethnocentrism depend on age and education of the purchasers. They were the most common among people with a basic vocational education and breeders over 55 years old. No statistical correlation between the ethnocentrism level and the gender of the respondents was found, although most researchers believe that women are characterized by a higher level of ethnocentricity.

Cattle breeders believe that feed from foreign companies is more innovative, accessible, and is of better quality. This information should be used by the managers of these companies to emphasize the attributes of their products, which will result in a sales increase and in market share gains in the long term.

An important issue in the process of identifying of the level of respondents' ethnocentrism is the problem of actual distinction between Polish and foreign companies by the purchasers. According to the conducted research, the respondents with the high level of ethnocentricity were the least familiar with feed companies in terms of prevailing capital. Due to high level of ethnocentrism of Polish cattle breeders, this information should be taken into account when shaping marketing strategies or promotional actions by Polish companies, e.g. building strong brands emphasizing their country of origin.

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SESSION 3

THE AGRI-FOOD VALUE CHAIN ANALYSIS: ECONOMICS, MANAGEMENT AND LOGISTICS

RESEARCH OF SUPPLY OF BERRY PRODUCTS IN UKRAINE

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Abstract

The berry market is an important part of the Ukrainian food market. A complete nutrition of the population is impossible without berry products. Berries provide the human body with vitamins and mineral compounds. Also, they have therapeutic properties and are valuable raw materials for the processing industry. The Ukrainian territory by its soil and climatic conditions is favorable for the cultivation of berries not only for the maintenance of own needs but also for the formation of the export potential. Thus, the Ukrainian exports of berry products in 2010-2015 increased by 3.6 times to $ 12.5 million US in 2015. Berry crops are characterized by early ripening, high yields, fast-growing, high reproduction rates, technological capacity and the ability to mechanized harvesting, as well as providing a quick turnaround of capital and return on investment. The special demand is the berry production grown by the organic production technology. However, at this time, the berry market is not optimal either for the structure or for volumes.

The berry supply in the market is formed by agricultural enterprises, households and import deliveries. A particular problem today is that the main entities forming berry supply in the market are households, accounting for about 97% of the output. The consequence is high labor costs, supply instability, poor quality of berries and low payback of their production. The high price of products leads to the fact that due to the low solvency of the Ukrainian population berry supply is provided only by half. The wholesale and retail trade is still underdeveloped. There are no diverse areas of industrial processing, as well as the range of products is limited. That is why the purpose of the article is to study the supply of berry products in the Ukrainian market and factors influencing its change.

Keywords: *demand, elasticity, export, import, market of berries, price, supply*

JEL Classification: *O13, Q11, Q12, Q13, Q17*

1   Introduction

The importance of berries in the human diet is constantly increasing. This is promoted by their properties which cannot be completely replaced by other products. They are a valuable dietary food product, a source of organic acids, sugars, tannins and aromatic substances. However, berries are the most appreciated for a significant amount of vitamins that have therapeutic value. The current increase in demand for berries is also due to the aggravation of environmental problems in the world, growth of stressful situations and, in general, the pace of life. Demand creates an offer. Therefore, there is a need to study the supply of berry products on the market in Ukraine and to study main factors influencing its change.

The market of berry production in Ukraine has a great potential for development both at the expense of domestic demand and the possibility of expanding export supplies. However, today it is in the formation stage and, therefore, the supply and demand are unbalanced. Despite growing demand for berry products, it cannot be called a product of prime necessity. The level of berry consumption is largely determined by the size of total income of the population. Low solvent demand of Ukrainians is one of the main reasons for the limited capacity of the domestic market. No category of people in Ukraine distributed by income level reaches the optimal berry consumption level of 4 kg and in the best case it corresponds to the indicator of 1.8 kg. Most consumers are forced to dwell on the marks of 0.8-1.6 kg (Mamalyga S.V., 2011). Current volume of production of fruits and berries in Ukraine is very low in comparison with countries with developed gardening. Even at the highest gross yield production of horticultural products per capita was about 50 kg, while in United States production of fruits and berries is 100 kg, in Austria - 134 kg, and in Holland - 149 kg. In recent years, the production of fruits and berries in Ukraine was slightly growing, yet in 2015 it amounted only 52.3 kg per capita, which is 36% less than consumptions rates for fruits and berries according to the Ministry of Health of Ukraine (Karpenko V., 2016).

The purpose of the study is to analyze the supply of berry products in the Ukrainian market and study main factors influencing its change.

1.1   Analysis of references

Irreplaceability of berries in the human diet prompts scientists to study the problems of functioning market of berry production at different levels. Thus, a group of scientists led by Kondratenko P.V. (2014) studied the current situation and prospects of berry production in Ukraine. In their opinion, these years the area under berry crops will increase significantly and their share in industrial production

will increase. However, they also note the negative trends hampering the development of the industry in the country. They include shifting the production of berry products to private households (about 70%), low rates of plantation reproduction, deficit of high-quality gardening material of modern domestic varieties and difficulty of the procedure for official import of seedlings from foreign countries, poorly developed infrastructure of the berry production market, etc.

V.A. Ruliev (2007) noted characteristic disadvantages of the market of horticultural products in Ukraine, namely not enough high quality of fruits, rather limited assortment, packaging shortage convenient for consumers, high regional fluctuations in prices and volumes of sales, decline of wholesale trade, limited credit resources, expansion of sales of products in spontaneous markets and highways and complete absence of domestic advertising of fruit and berry production.

According to the research of Sherstiuk S.V. (2012), the main operators in the berry production market in Ukraine are agricultural enterprises, farms, households and members of horticultural cooperatives. Due to the fact that products of private households and gardening companies are not actually taxed, they have significant competitive advantages over agricultural enterprises that is one of the reasons for the decline of industrial horticulture in Ukraine.

Formation and functioning of the gardening market is impossible without developing an effective organizational and economic mechanism. Marmul L.O. (2006) determines the following main elements: specialization and concentration of production, arrangement of horticultural farms, marketing activities and research. In addition, the author notes that the economic mechanism of state support plays an important role in the formation of the berry production market. This includes support the growing demand for berry products; stimulation of the stable development of the branch on the basis of legislative normative acts; improvement of innovation, pricing, credit, insurance policy and export-import regime.

Studies of Salo I.A. (2016) should be paid attention. She indicates that in order to fully meet the needs of consumers with fruits and berries throughout the year, there is a need for appropriate legislative regulation regarding the establishment of service cooperatives that would carry out wholesale purchases of products from the population during the period of mass fruiting and by arrangement and continue to be implemented through a wholesale or retail outlets. This would enable legalization of commodity flows of fruits and berries, control of their market entry of appropriate quality, introducing sorting and packaging and contributing to transparent pricing and income growth.

An important direction in the development of the berry production market is the production of organic products. The market of organic berries in Ukraine

grows by 2-3% annually and its volumes make up 200 thousand dollars or 180-190 thousand tons of berries (Marmul L.O., Novak N.P., 2016). At the same time, as noted by the authors, the area under organic berries in Europe is limited which creates additional opportunities for the development of the Ukrainian market of organic berry production.

Foreign scientists also pay considerable attention to the functioning of the market of berry production. The main factors influencing its development are introduction of innovative technologies and increased consumer demand for berries. Also, a group of American scientists Tourte L., Bolda M., Klonsky K. (2016) points out the importance of developing the organic berry sector. However, as rightly emphasized by Italian scientists Peano C., Baudino C., Tecco N. and Girgenti V. (2015), the market of berry production depends on the use of environmental brands and the application of "green marketing" methods.

According to Kulakov V. (2014), when forming parameters of the berry production market and definition of the demand level it is necessary to apply tools that would allow taking into account the impact of income level on the size of market demand.

The analysis of references on this topic indicates the relevance of the research topic not only in the Ukrainian market but also abroad.

2   Data and Methods

The theoretical and methodological basis of the research is a modern economic theory, a systematic approach to the study of economic and organizational aspects of the development of industrial horticulture and scientific works of domestic and foreign scientists on the functioning of the berry market.

The information base of the research was materials of State Statistics Committee of Ukraine and regions, primary records and annual reports of horticultural farms, results of sociological surveys and personal studies of the author.

In the process of research, general scientific and economic methods were used: monographic method (in problem statement and defining conclusions); calculation-constructive method and extrapolation method (in substantiating the supply dynamics and forecasting main economic indicators of the development of the domestic market of berries; in determining the berry export and import); index method (in the research of the current state of the berry market), balance method (in determining the level of self-sufficiency); grouping method for identifying factors that influence the berry supply; analysis of supply and demand elasticity (when assessing the impact of price and income on demand and supply on the market).

3   Results and Discussion

The effective functioning of any market depends on the ratio of demand and supply of a particular type of product or service on it. The supply of berries is the quantity of berry products that producers and sellers want and can sell on the market. According to Melnyk L.Y., the supply indicator should be thoroughly analyzed, as it is not expedient to produce at least one extra kilogram of product if it has no sales or causes additional losses (2001). The market supply of berry products is the total volume of individual offers of the producers of berries. The berry volumes on the market should guarantee:

- Provision of growing needs of the population and processing industries of Ukraine in the quality of berry products;

- Increase in the export of Ukrainian berry products in order to increase its producers' incomes, ensuring the effective functioning of the market infrastructure and increase in currency incomes in the country's economy.

Main producers of berries in Ukraine during the last period are agricultural enterprises and households. Also, the volume of berries entering Ukraine from other countries, that is, the size of imports, should be taken into account. Thus, the market supply of berry products can be represented by the following formula:

$$S = S_1 + S_2 + S_{import},\tag{1}$$

S_1 is supply of berry production by agricultural enterprises;
S_2 is supply of berry production by households;
S_{import} is supply of berry products at the expense of imports.

According to the Association "Ukrsadprom" (2017), in recent years in Ukraine the stable production is in the range of 120-125 thousand tons of berries. In the general structure of fruit and berry production, berries occupy about 6%. Strawberries and wild strawberries remain the leading crops among berries accounting for almost half of the total harvest. Although industrial enterprises produce only 10-15% of berries in Ukraine, the commodity structure of their production almost completely repeats the general one. Areas for berry crops in Ukraine are stable (within 20 thousand hectares); mostly they are used for growing strawberries, raspberries and currants. The average yield of berries is over 60 c/ ha. Traditionally, the largest amount of berries is grown in 5 regions of Ukraine (Vinnytsia, Dnipropetrovsk, Donetsk, Zhytomyr and Kiev).

In Table 1 we consider the dynamics of changes in the supply of berries in Ukraine by agricultural enterprises and households.

Table 1 **Dynamics of supply of berries in Ukraine (thousand tons)**

	Supply of berry production by agricultural enterprises (S_1)	Supply of berry production by households (S_2)	Supply of berry production by all categories (S_1+S_2)
2001-2005	3.6	87.5	91.1
2006-2010	6.4	102.7	109.1
2011-2015	9.4	118.9	128.3
2016	12.6	115.1	127.7
2017	14.3	112.5	126.8

Source is proposed according to data of http://agroua.net/economics/statistics/.

Table 1 allows us to conclude that main suppliers of berry products in the Ukrainian market are households which share in the total production of berries ranges from 96% in 2001 to 89% in 2017. Of course, the concentration of berry production in private households is not a progressive phenomenon but under the condition of a crisis situation in Ukraine, it is with the help of private berry production, a considerable part of the existing problems is solved. According to Kropyvko M. (2012) and Svynous I. (2010), households contribute to the provision of people with berries. According to domestic consumers, they are more qualitative than industrial production because they contain fewer residues of harmful chemicals for the human body. Also, this production is less dependent on the rising cost of energy carriers and other material and technical resources because manual labor dominates and is not taken into account in determining the expediency and efficiency of their economic activity. Berry sale provides the population with a certain additional income which is important enough with its low solvent demand.

At the same time it is necessary to emphasize the opinion of Salo I.A. (2016) that berries grown by households are considered uncompetitive in the market under the WTO-EU agreements. Industrial enterprises can implement proper quality control at all stages of production, processing and marketing and it is practically impossible for households to do this. Even if the manufactured product meets the requirements for its qualitative indicators, there is no mechanism for quality control complicated by the presence of a large number of manufacturers. This is usually a negative factor. However, regardless of this, households occupy their niche in the domestic market of berries and significantly affect the formation of supply, demand and price situation.

One of the ways of development of private berry production may be unification of farms on the basis of cooperation which actively operate in economically

developed countries. These structures could carry out organizational policy, ensure implementation of technological processes in farms, monitor the quality of products, collect, store and sell berries.

The main factors affecting the supply of berries by agricultural enterprises and households are the area size for fruit bearing plantations and their yield. In recent years there has been a slight increase in the area of berry plantations in agricultural enterprises ($y = 0.2x + 3.3857$) and decline in households ($y = -0.225x + 16.629$), as shown in Figure 1. However, the total area of plantings has not changed much.

Figure 1 **Trends in changing areas for berry plantations in Ukraine, thousand ha**
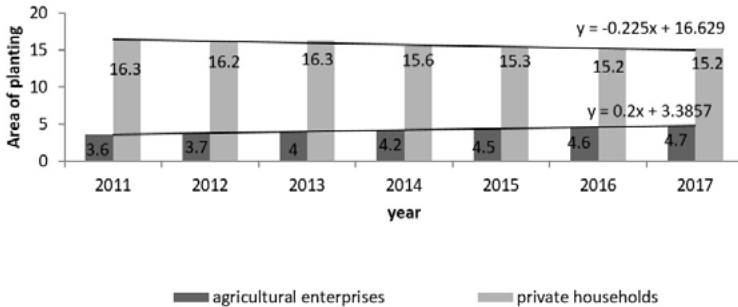
Source is proposed according to data of http://www.ukrstat.gov.ua/druk/publicat/ kat_u/publ7_u.htm.

Regarding the structure of plantations, the conducted studies show that in 2017, areas for wild strawberry planting occupied 39% of all berry plantations, raspberry and currant plantations occupied 50% equally and gooseberry and blueberry plantations were 11% equally.

Regarding the yield of berry crops, it should be noted the paradoxical situation that has developed in Ukraine. Despite the lack of intensification, the yield of berries in small farms of the population predominates almost three times the yield in enterprises engaged in industrial horticulture (Figure 2).

Figure 2 **Yield dynamics of berry crops in Ukraine, t from 1 ha**
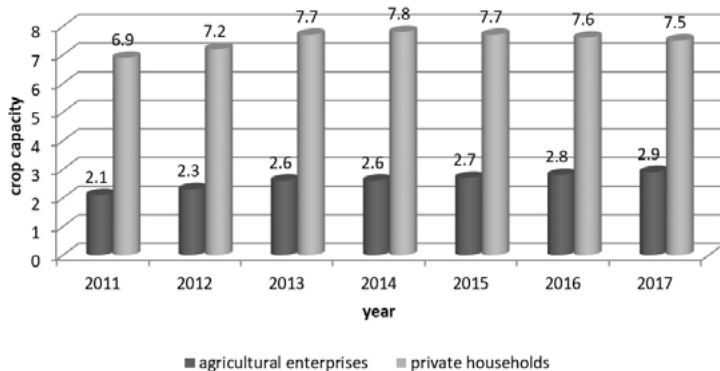
Source is proposed according to data of http://www.ukrstat.gov.ua/druk/publicat/ kat_u/publ7_u.htm.

Therefore, one of the factors that directly influence the increase of the supply of berry products in Ukraine will be the increase in the productivity of berry plantations on an industrial basis of an intensive type. In Ukraine, an increase in the berry production is also restrained by the shortage of high-quality seedlings of modern domestic varieties and complexity of the procedure for the official import of seedlings from foreign countries. Today, there are only a few industrial nurseries that have seedling material of high quality and therefore the needs of producers of our country are only 30% provided with domestic seedlings (Kondratenko P.V., 2014).

Obviously, that under current conditions of berry production in Ukraine neither agricultural enterprises, nor households can fully cover the demand of the population in berries and, therefore, it creates the preconditions for the development of trade in imported products. That is why the third component of the berry supply on the market is the supply at the expense of imports.

Comparing the volumes of imports and exports on the balance of fruit and berry production during the last five years, we found that the ratio of the volume of fruit and berry imports to Ukraine to its own production was from 47.5% in 2012 to 30.7% in 2016 (Table 2). This indicator tends to decrease by 16.8 points. It is also necessary to note the dynamics of the growth rate of the export coverage by importing fruit and berry products in Ukraine and it indicates the need to intensify its own production in the country with the maximum coverage of the needs of the population in consumption.

Table 2 **Dynamics of volumes of fruit and berries at the expense of export-import operations**

	2012	2013	2014	2015	2016	2016 в % before 2012
Production, thousand tons	2465	2871	2435	2539	2385	96.8
Imports, thousand tons	1171	1172	856	588	732	62.5
Exports,thousand tons	351	392	350	324	283	80.6
Ratio of imports to production,%	47.5	40.8	35.2	23.2	30.7	-16.8
Coefficient of export coverage by imports,%	30.0	33.4	40.9	55.1	38.7	8.7

Source is proposed according to data of http://www.ukrstat.gov.ua.

The main fruit importers are the countries of Europe: Poland, Germany and the Netherlands and among the CIS countries it is Georgia.

In 2011-2017, according to State Statistics Service of Ukraine, imports of fresh berries decreased by almost 30% (from 61053 to 44256 tons) and exceeded exports in 2017 by 7.5 times (Figure 3). The most amounts of fresh strawberries to the domestic market of Ukraine were from Greece, Turkey, Spain and the Netherlands. The main importers of frozen blackberries, raspberries, etc. for the Ukrainian market were suppliers from Poland (580.7 tons or 92.1%). It should be noted that in 2015-2016, the share of imports of strawberries significantly decreased compared to 2014 which allowed domestic consumers to consolidate in the domestic market.

Figure 3 **Volumes of exports-imports of fresh berries in Ukraine, kg**

Source is proposed according to data of http://www.ukrstat.gov.ua.
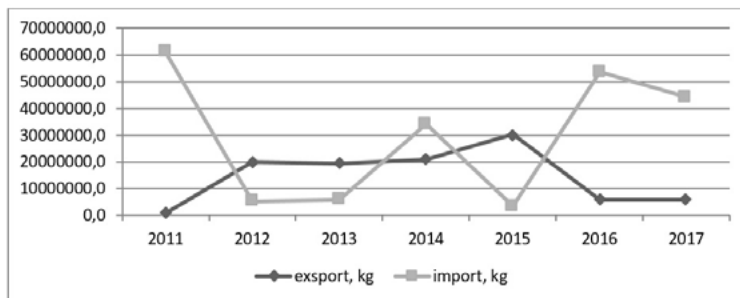
Analyzing Figure 3, it can be also concluded that export-import relations with suppliers of fresh berries in Ukraine and from Ukraine are at the stage of formation there is no systematic follow-up, etc. Therefore, under the modern conditions there are great prospects for carrying out foreign trade activities in the market of berries.

Having analyzed the supply of berries at the expense of imports into Ukraine (S_{import}), it is possible to determine the total volume of supply in the market of berries (Table 3).

Table 3 **Supply volumes in the berry market in Ukraine (thousand tons)**

	Supply of berry production by agricultural enterprises (S_1)	Supply of berry production by households (S_2)	Supply of berry products at the expense of imports (S_{import})	Volume of supply in the market of berries (S)
2011	7.5	112.0	61.1	180.6
2012	8.3	116.2	5.3	129.8
2013	10.5	125.9	5.8	142.2
2014	11.1	121.8	34.3	167.2
2015	12.0	118.0	3.6	133.6
2016	12.6	115.1	53.6	181.3
2017	14.3	112.5	44.3	171.1

Source is proposed by authors according to data of http://www.ukrstat.gov.ua.

In recent years, the supply of berries in the Ukrainian market has a tendency to decrease. This happens under the influence of various factors. A factor that directly influences the volume of supply is the price of berries. We have found that there is a direct link between the supply of berry products and its price, as shown in Figure 4.

Figure 4 **Dependence of the berry supply and the price in Ukraine in period 2011-2017**

y = 125,78x - 2851,6

Source is proposed by authors according to data of http://www.ukrstat.gov.ua.
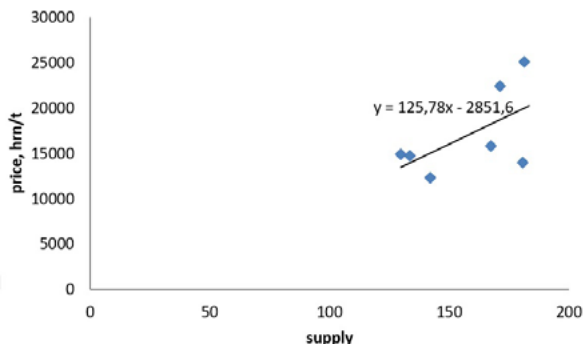
That is, the increase in the price of berries will encourage commodity producers to increase supply volumes. However, it is very important to analyze the dependence of the demand for berries on income from the population, since the berry production, despite its importance, is still not a product of first necessity. In this case, it is advisable to apply the theory of elasticity. In this case, it is advisable to apply the theory of elasticity. Elasticity of demand by income characterizes the degree of change in the value of demand for goods in response to changes in the size of consumer income. It is important to note that in view of the high inflation rates in Ukraine, in the calculations we used real income of the population (minus the level of inflation). Due to the lack of statistical data on the consumption of berries, calculations were made on all fruit and berry products, since, in our opinion, the trends remain the same (Table 4).

Table 4 **Elasticity of fruit and berry products in Ukraine by income (in 2012-2016)**

Year	Consumption of fruit and berries per person per year, kg	Real income per capita, UAH	Coefficient of elasticity of demand for fruit and berries by income
2012	53.3	28344.6	-
2013	56.3	28710.1	4.3
2014	52.3	23702.2	0.4
2015	53.9	24121.4	1.7
2016	49.7	36063.1	-0.2

Source is proposed by authors according to data of http://www.ukrstat.gov.ua.

The given calculations show that fruit and berries belong to a group of usual goods for which the demand of consumers will increase with income growth. Consequently, in Ukraine there are real opportunities for growing demand for berries due to the growth of consumer revenues. This will have a positive effect on the expansion of supply of berry production.

The increase of the berry supply in Ukraine will also be affected by the improvement of export opportunities of the studied branch. The factors contributing to the export orientation of the Ukrainian berry market are favorable climatic conditions for production; proximity to EU markets; high quality of products; decrease due to devaluation of the hryvnia; competitive prices; cheap labor force which contributes to the production of blueberries, blackberries, bilberries and raspberries. The low cost of manual labor remains the preponderance of Ukraine in terms of the industrial cultivation of berries. Foreign market prices for Ukrainian berry products are higher by 30% but only 8% of the cultivated berries are exported. The country has competitive advantages in growing labor-intensive berry crops such as blueberries, blackberries, bilberries and raspberries. These berries are the main product for export to the countries of the European Union. The main consumer countries of the Ukrainian fresh berries are Poland (1.6 million dollars) and the Netherlands (1.3 million dollars). As for frozen berries, Ukraine exports to Poland ($ 3.4 million), Germany ($ 1.0 million), Austria ($ 0.7 million), the Netherlands ($ 0.5 million) and France ($ 0.4 million) (Mostoviak M., 2016).

An important direction in the development of the berry market in Ukraine is the cultivation of berry products by organic technologies. There is no official statistics on organic agrarian and food products in Ukraine. However, according to experts, the Ukrainian producers of organic berries are now exporting almost the entire harvest because there is no demand for it within the country. It is important that zero export duties are set for organic products in the EU and quotas are not subject to organic production. Consequently, the main obstacle to the export of domestic organic berry products to the EU is regulatory barriers. About 80% of organic berry products are grown by the population and small farms. A significant part of these farms are involved in projects for the implementation of organic berry growing in Ukraine and cooperate with foreign companies, primarily with companies from Germany. In Ukraine, the following types of organic berry crops are certified: raspberries, blackberries, wild strawberries, strawberries, blueberries, cranberries, guelder rose, cornelian cherries, black chokeberries (aronia), elderberries; fresh, dried, frozen berries and processed berries (jams, syrups, juices, canned berries, etc.). Organic berries can keep marketability for a limited period. Therefore, practically the only option to sell organic berries abroad is to freeze it with the appropriate technology. Such equipment is unprofitable for farmers

who grow berries on small plots of land (up to 50 hectares). Farmers are united in cooperatives to solve this problem in Europe. Domestic market of organic berry products in Ukraine is in the stage of formation. Therefore in the future there can be a significant part of the supply of berry products.

4   Conclusion

1. The supply of berries is the quantity of berry products that producers and sellers want and can sell on the market. The volumes of berry supply should guarantee the growing needs of the population and processing industries of Ukraine in berry products of the proper quality and increase the export of the Ukrainian berry products in order to have bigger income of its producers, ensure the efficient operation of the market infrastructure and increase the currency income in the country's economy.

2. The main components of the supply of berry products in Ukraine are the supply of agricultural producers, the supply of private households and the supply of berries at the expense of imports. The peculiarity of the berry market in Ukraine is that main suppliers of berry products are households which account for about 70% of the total volume. Specific weight of the output from agricultural enterprises is about 8% and imports are about 22%.

3. During the last decade, the supply of berries in Ukraine has a tendency to reduce, despite the dissatisfied consumer demand for berry products. This is due to reduced areas of fruit bearing plantations, low productivity of production and underdeveloped infrastructure in the berry market, etc. In addition, there is a direct dependence between the growth of consumer incomes and the consumption of berries. Under the conditions of the economic crisis that prevails in Ukraine, the income level of consumers does not allow them to eat enough berry products. However, there are significant prospects for the development of the berry market.

4. Competitive advantages of the studied branch beyond its borders will positively affect the expansion of berry supply in Ukraine. They include favorable climatic conditions for production; proximity to EU markets; high quality of products, decrease due to devaluation of hryvnia cost price; competitive prices, as well as cheap labor.

5. An important direction for expanding the berry supply in Ukraine is the production of organic products.

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DEVELOPMENT OF CONSUMER PRICES OF SELECTED TYPES OF MILK AND DAIRY PRODUCTS

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Abstract

The paper analyzes mutual relationships between purchase, processing and consumer prices of milk and dairy products and also the main factors that may influence the current price development in the Slovak republic.

Keywords: *purchase price, processing price, consumer price, milk consumption*

JEL Classification: *G, E21, E30*

1   Introduction

Food consumption, both in the world and in our country, has undergone major changes in recent decades and this trend keeps going on. In food consumption there have been significant changes both in amount and structure. These changes have been affected by various factors. The most important factors influencing food consumption include the development of the income of population, development of consumer prices, development of the distribution network, advertising and also health education. Dairy industry belongs among the leading food industry in developed countries. Every developed country in the world is trying to attain self-sufficiency in production of basic foods and one of the most important are milk and dairy products. Throughout the recent years Slovakia has been in the role of a country dependent on imports. Production of milk has a great social significance not only as standard foodstuff but also in terms of livestock farming in agricultural primary production. It influences the livestock breeding

economy, rural employment and also the social and ecological program of agricultural products processing.

1.1 Situation in the dairy market

Throughout the last ten years the milk sector in Slovakia was hit by three dairy crises. The biggest fluctuation in milk purchase prices took place between 2008 and 2009 and we call it the major milk crisis. Further drop in purchase prices came in 2012. The last middle-class crisis occurred between 2015 and 2016 (Table 1). Until 2015 the market was regulated. In 2015, with the abolition of milk quotas, milk production increased and milk became overproduced. In addition, Russia has issued an embargo on European products and China has restricted imports of dairy products from the EU. Due to this crisis the milk sector has declined. "Over the past ten years, the number of dairy cows has fallen by 31 % (55,102), milk deliveries have fallen by 15 % (141 million kg), nearly 35 % of businesses (133) have finished milk production, but the number of milk processing plants remained unchanged " (Štefániková, 2017). After the abolition of milk quotas in 2015 the price of raw cow's milk began to fall below production costs. Milk purchase prices did not cover the average production costs. In 2010, the production cost of a liter of milk was 0.39 €. In the reference period 2010-2016 these values ranged from 0.38 € (2015) to 0.43 €. l^{-1} (2011). This is due to the presence of competing surplus milk on the EU market supplied by dominant European producers.

Table 1 **Purchase prices of raw cows' milk in Slovakia (€.(100 kg)$^{-1}$)**

Year	Purchase price	Year on year change € (100kg)$^{-1}$ %	
2008	33.76	-	-
2009	20.82	-12.94	-38.33
2010	27.24	6.42	30.84
2011	31.62	4.38	16.08
2012	29.46	-2.16	-6.83
2013	32.65	3.19	10.83
2014	33.82	1.17	3.58
2015	27.95	-5.87	-17.36
2016	26.62	-1.33	-4.76

Source: http://www.vuepp.sk/dokumenty/komodity/2017/Mlieko06_17.pdf and author's computations.

2   Data and methodology

The selected methodological approach was applied in order to analyze the mutual price relationships between the purchase, selling and consumer prices of milk and dairy products during the period of 2010-2016. This goal was met by:

- collection of domestic and foreign data,
- analysis, synthesis and comparison of data processed in a tabular, graphical and textual form.

The analysis was based on the latest publications, databases, data from the SO SR, NPPC-VÚEPP (own analyses, databases, research tasks and situational and forward-looking statements) and PPASR. The analysis includes comparison of the development of milk consumption and selected dairy products and milk purchase prices in Slovakia in 2008-2016.

3   Results and discussion

In the reference period (2008-2016), the trend of milk and dairy products consumption per capita in the Slovak Republic was increasing, with the exception of the year 2011, but is not close to the Pan-European average ranging from 320 to 340 kg per capita. The recommended amount is 270 kg per capita per year. Consumption of selected dairy products corresponded to their current price development. Consumption of milk had a fluctuating trend (Table 2). During the reference period (2008-2016) it fell by 4.2% (from 47.7 kg to 45.7 kg. citizen^{-1}. year^{-1}). Since 1992, consumption of milk has fallen by 50.6% (from 92.5 kg. citizen^{-1}. year^{-1}), what is an annoying drop. From 2008 to 2016, consumption of dairy products grew by 15.56 % (from 153 kg. citizen^{-1}. year^{-1} to 176.8) and since 1992 it has declined by 7.43 %. The highest consumption of milk and dairy products was recorded in 2016. Despite this fact, this year showed historically the lowest consumption rate of milk.

Table 2 **Average yearly consumption of milk and selected dairy products in Slovakia (kg. citizen^{-1}. year^{-1})**

Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016
Dairy products	153.0	153.3	162.8	156.9	158.6	158.5	166.8	167.6	178.8
Drinking milk	47.7	48.9	53.9	52.5	53.7	48.7	47.6	48.0	45.7
Butter	2.2	2.8	2.6	2.9	3.2	3	3.2	3.5	3.9
Cheese and curd	9.2	9.8	9.9	10.4	10.1	11.4	11.5	12.1	13.9

Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016
Curd	1.9	2.0	2.1	2.0	2.1	2.2	2.4	2.5	2.6

Source: http://www.vuepp.sk/dokumenty/komodity/2017/Mlieko06_17.pdf.

Consumption of cheese and curd attained the record value in this year. Decline in milk consumption is mainly caused by the rise of consumer prices of drinking milk. We analyzed the course of the selling price of semi-skimmed milk.

From 2008 the consumer price of semi-skimmed milk increased by 19.72 % to 0.79 €. l^{-1} (2016). From 1992, when it was at the level of 0.23 €. l^{-1}, to 2016 the price rose by 243 %. There is an inverse proportion between milk consumption and consumer price and milk consumption declines as the consumer price increases.

In the reference period the purchase, selling and consumer prices of this product, excluding VAT, alternated - after each increase there was a decrease and vice versa (Table 3). In 2014, the selling price decreased by 0.02 €. l^{-1}, while the purchase price of milk increased by 0.01 €. l^{-1} and in 2016 the selling price increased by 0.03 €. l^{-1} and the purchase price decreased by 0,01 €. l^{-1}.

Table 3 **Selling prices distribution of semi-skimmed milk (€. l^{-1}).**

Year							
Indicator	2010	2011	2012	2013	2014	2015	2016
Purchase price	0.27	0.32	0.30	0.33	0.34	0.28	0.27
Selling price	0.40	0.43	0.40	0.45	0.43	0.35	0.38
Consumer price without VAT	0.65	0.69	0.74	0.75	0.79	0.77	0.65
Consumer price with VAT	0.77	0.82	0.88	0.89	0.96	0.94	0.79
Disparity	0.38	0.37	0.44	0.42	0.45	0.49	0.38

Source: http://www.vuepp.sk/dokumenty/komodity/2017/Mlieko06_17.pdf and author's computations.

In the reference period the average prices of raw cow's milk ranged from 0.27 (2010) to 0.34 €. l^{-1} (2014). The abolition of milk quotas in 2015 launched problems. They caused overproduction of milk and a big drop in prices by 0.06 € per liter. In the next year milk producers responded to this situation by production limitations which led to higher prices. In 2015 and 2016, the communication campaign "Save Slovak Milk", together with petitions, was carried out to promote milk production.

Chart 1 **Structure of consumer prices of semi-skimmed milk in Slovakia in years 2010-2016**
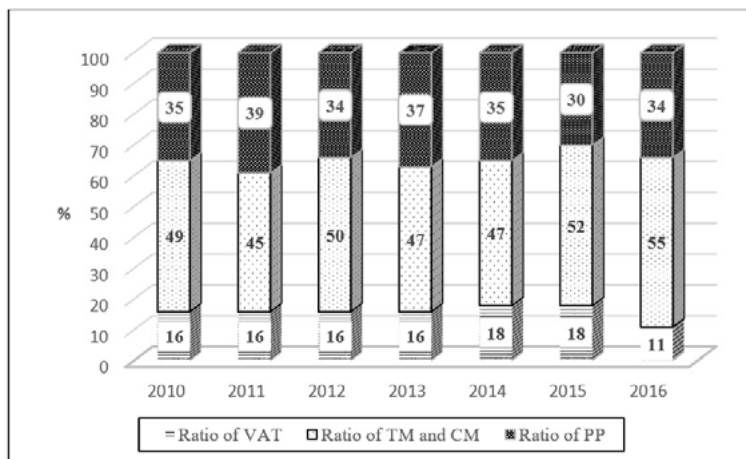
Source: Author's computations, OM – trade margin, SM – consumer margin, NC – purchase price.

The analysis carried out by SZPM revealed different purchase prices among milk purchasers within Slovakia, but also in purchase prices paid by individual milk purchasers to their suppliers - primary milk producers. The difference between the highest and the lowest milk price reached 0.08 €. l⁻¹. Variation of milk prices in the European Union has been traditionally very high. It ranges from approximately 0.28 € to 0.55 € per kilogram of milk. On average, European purchase prices reached the level of more than 0.33 € and have a slightly increasing trend. Compared to these facts, Slovak primary producers receive for milk, on average, 0.03 € per kilogram less.

The disparity between the purchase and consumer prices of semi-skimmed milk grew year-on-year, except the years of milk crises, when prices dropped. This means that the share of cow's milk producer's price in the consumer price of semi-skimmed milk decreases.

Consumer price development was affected by the increase of VAT in 2010 to 19 %, in 2014 the VAT rate was 22 % and on 1.1.2016 it was reduced from 20 % to 10 %. In 2017, according to the data of the Statistical Office of the SR, the average consumer price of semi-skimmed milk increased by 7.4 % compared to 2016.

Fats and protein components of milk are evaluated in production of cheese, curd, butter and drinking milk. Price increase of these products has also been

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recorded. Consumption of curd per capita in Slovakia in the reference period of 2010-2016 is about 2.2 kg per person per year.

Development of purchase prices of cow's milk necessary for production of 1 kg of curd, selling prices and consumer prices is shown in Table 4.

The disparity between the milk purchase prices and the consumer prices of curd increased year-on-year with the exception of 2011 and 2013, which indicates a reduction in shares of primary milk producers in consumer prices.

Table 4 **Selling prices distribution of curd (€. kg^{-1})**

Indicator	Year						
	2010	2011	2012	2013	2014	2015	2016
Purchase price	1.84	2.19	2.05	2.25	2.13	1.91	1.84
Selling price	2.06	2.31	2.45	2.52	2.59	2.52	2.52
Consumer price without VAT	3.43	3.66	3.76	3.83	3.92	3.84	3.92
Consumer price with VAT	4.08	4.36	4.48	4.56	4.78	4.68	4.31
Disparity	1.59	1.47	1.71	1.58	1.79	1.93	2.08

Source: http://www.vuepp.sk/dokumenty/komodity/2017/Mlieko06_17.pdf and author's computations.

Chart 2 **Structure of consumer prices of curd in Slovakia in years 2010-2016**
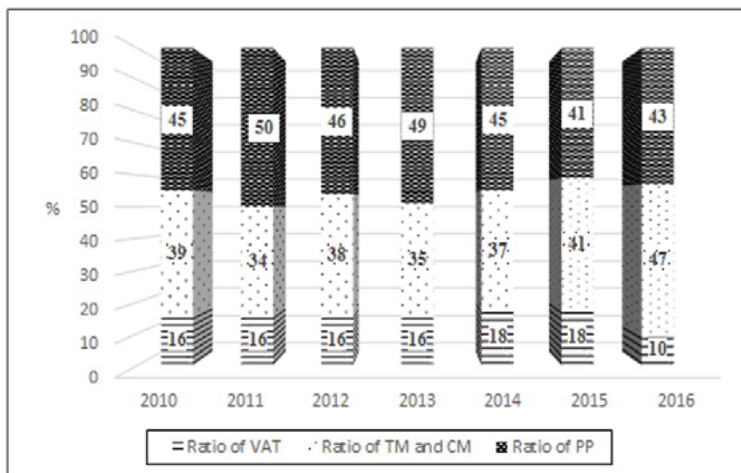
Source: Author's computations, OM – trade margin, SM – consumer margin, NC – purchase price.

The most significant increase in price of dairy products was recorded in case of butter. From 2010 to 2016, the total butter consumption rose from 2.2 to 3.9 kg per capita per year, which is an increase by 77 %. This was caused by a gradual shift of consumers from vegetable fats towards traditional sources of fats (butter, hog lard).

The development of purchase prices of cow's milk necessary for production of 1 kg of butter, its selling and consumer prices is shown in Table 5. The development of consumer prices of butter without VAT in the reference period had a predominantly increasing trend, except of 2016, when there was the decrease by 0.33 €.kg^{-1} compared to 2015.

Table 5 **Selling prices distribution of butter (€. kg^{-1})**

Year							
Indicator	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Purchase price	4.00	4.50	4.40	4.52	4.74	4.64	4.30
Selling price	4.13	4.66	4.32	4.49	4.58	4.05	4.14
Consumer price without VAT	5.78	6.45	6.52	6.86	6.95	6.62	7.12
Consumer price with VAT	6.88	7.68	7.76	8.16	8.48	8.08	7.84
Disparity	1.78	1.95	2.12	2.37	2.21	1.98	2.82

Source: http://www.vuepp.sk/dokumenty/komodity/2017/Mlieko06_17.pdf and author's computations

From 2010 to 2016, the consumer price increased by 12.3 % (1.34 €. kg^{-1}). The purchase price trend was copying the development of the selling price. During the reference period the purchase price of raw cow's milk necessary for production of 1 kg of butter reached the highest value in 2014 and the lowest in 2010, their difference was 0.74 € .kg^{-1}.

Chart 3 **Structure of consumer prices of butter in Slovakia in years 2010-2016**
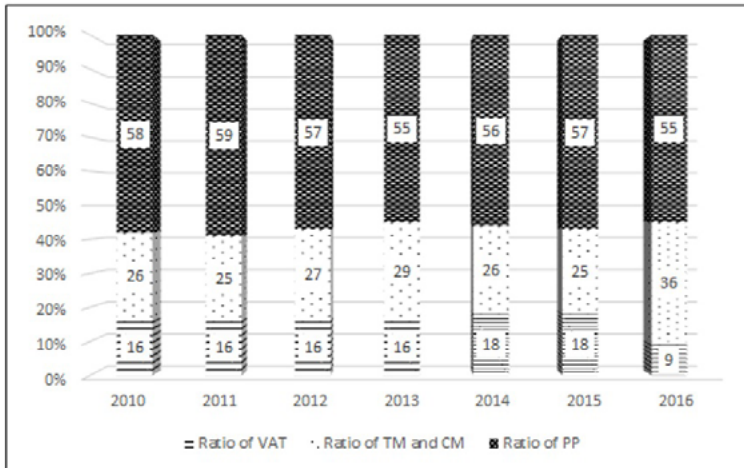
Source: Author's computations, OM – trade margin, SM – consumer margin, NC – purchase price.

The disparity between the purchase price of milk and the consumer price of butter was increasing (until 2014). This shows that the share of cow's milk producer's price in the consumer price of milk had a decreasing trend and then increasing since 2014.

In the reference period, the milk vertical, i.e. primary production, processing and trade did not avoid the problems of unbalanced business relationships. Prices in shops do not copy the decrease in purchase prices of raw cows' milk. The trade and market develops a long-term pressure on selling prices, that is, the prices for which milk and dairy products are purchased from milk processors. Milk processors transfer this pressure on primary milk producers. Unfair business practices, especially uneven margin distribution, emerged. The smallest portion is received by primary producers and processors. The highest percentage is claimed by traders. In case of butter prices, some traders claimed a 100 % margin. The undesirable phenomenon is that traders apply higher margins on domestic dairy products than to foreign ones of the same category and this is reflected in consumer prices. In the end, the consumer price of milk and dairy products depends on market.

4   Conclusion

In the reference period consumption of milk and dairy products was rising, which was influenced by eating habits and also by the level of customer prices in relation to the average income of the population. At the same time, there was a demand for full-fat milk and dairy products which contain significantly more protein and fat. The total consumption of dairy products in Slovakia in 2016, after the average fat content had been adjusted, reached 7.35 kg per capita. Production of Slovak milk fat is 5.9 kg per capita. To achieve self-sufficiency in milk fat production, Slovakia lacked 35,000 dairy cows. If this rising trend in dairy products consumption is going to continue, the rate of our self-sufficiency in milk fat and protein will decrease. If adequate support measures are not taken, decrease in number of dairy cows in Slovakia will continue and we will be forced to import dairy products from abroad.

The priorities of the Slovak Republic include provisions of health and consumer protection in terms of food safety.

Milk purchase prices in the reference period in Slovakia constantly lagged behind the European Union average and we also have significantly less support than European farmers. That is why Slovak primary producers expect an increase in purchase prices of raw milk and government support to the extent of neighboring countries. This is the only way how to stabilize milk production in Slovakia.

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COCOA MARKET IN THE WORLD AND IN SLOVAKIA: EXAMPLE OF SUPPLYING COCOA POWDER

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Abstract

The paper analyses cocoa market. Specifically, production in the countries which belong to the biggest producers of cocoa in the world, consumption of this commodity in the European countries which, on the contrary, belong to the countries with the highest consumption of cocoa in the world. By statistical methods of trend equalization we analyse time series of consumption of cocoa powder in Slovakia from 1990 to 2016. In the last part we compute optimum amount of supply of cocoa powder from Mexico to Slovakia. It is a static model of supply with deterministic movement of demand after this commodity. The amount of supply is selected based on total expected costs which emerge within decision on the acquisition of the given supply. These costs must be minimal.

Keywords: *optimal order quantity, supplies, consumption, production, cocoa*

JEL Classification: *M2, C32, D2*

1   Introduction

The cocoa bean also referred to as cacao or simply cocoa, is the dried and fully fermented fatty seed of Theobroma cacao, from which cocoa solids and cocoa oil are extracted. The "beans" are the essential ingredient for chocolate and cacao products. Products received from cocoa beans are not only used in chocolates, but also in a wide range of food products.

Growing expansion of chocolate confectionary business is boosting the demand for cocoa beans across the globe. Every year nearly 4 million tones cocoa beans are produced and around 92% of total cocoa beans are utilized for chocolate

production. Rising popularity of cocoa-based products such as cocoa powder, cocoa butter, cocoa beverages and beauty products are driving the growth of global cocoa beans market.

Major production of cocoa is generated from emerging economies. Poor infrastructure and lack of communications in such regions are impacting the production of cocoa beans. Nearly 95% of total cocoa production comes from small farmers. In 2009, Indonesian government launched a program which will boost the production of cocoa beans in Indonesia up to 600,000 tons annually. In 2015, USD 100 million was invested to distribute new seedlings among Indonesian farmers. However, these initiatives have shown limited results which are hindering the growth of global cocoa beans market.

The global cocoa beans market is estimated to reach USD 16,7 billion by the end of 2024, growing at compound annual growth of 3,1% during the forecast period.

However, rapid increase in demand for chocolate flavoured products, cocoa powder and cake in China, Malaysia and India are encouraging the growth of cocoa beans market in Asia-Pacific region. China is the 9th largest importer of cocoa paste and cocoa powder.

Huge demand from chocolate industry is bolstering the cocoa beans market. In 2015, retail sales of chocolate are increased by 0,6% in the USA and sales of cocoa powder and cakes is also increased by 5% in China. Increasing demand of chocolate based products is expected to drive the growth of cocoa beans market in the near future. [1]

2 Data and methodology

In the paper we use data from various web portals dealing with statistics like: Eurostat, Statistical Office of the Slovak Republic, Statista. We also used information from International Cocoa Organization and so on.

Trend line of the time series

The main objective of the analysis of time lines is definition of basic tendency of its development, thus setting its trend. Trend is defined by methods which are generally called equalizing or smoothing time series, i. e. supplementing time series of empirical values $y_1, y_2, \dots y_n$ by series of values without periodical and random fluctuation. [5] In case of trend curves we searched for possibilities provided by software IBM SPSS, whereas the most suitable alternative according to criteria R^2 was a quadratic trend curve, general formula of which is as follows:

$$Y_t = \beta_O + \beta_1 t + \beta_2 t^2, \, t = 1, 2, \dots n \text{ (1)}$$

Static model of supplies with probable deterministic movement of supplies

Palúch – Peško (2006) state that „within searching cost reserves we found out, that companies have them inadequately bonded in supplies." The authors as well state that „it was shown, that effective solution is provided by classic optimizing and statistical methods."

A supplying model which was used within solution of the given problem is known under the expression static model of supplies with probable deterministic movement of supplies. Sixta and Žižka (2009) say „demand in this case is described by probability."

Function of total assumed costs within decision on how to ensure supply in the amount x can be expressed by relation:

$$N_c(x) = \sum_{y=0}^{x-1} c_p(x-y)p(y) + \sum_{y=x+1} c_z(y-x)p(y) \quad (2)$$

where: x – amount of provided supply,

y – amount of demand which reaches discrete values,

$p(y)$ – probability that demand in the future will be in size y,

c_z – unit costs from insufficient supply,

c_p – unit costs from surplus supply.

Optimizing task is to set an amount of supply x, for which the total costs $N_c(x)$ will be minimum, whereas for optimum amount of supply both sides of the following formula must be approved:

$$p \; y \le x_{opt.} - 1 \; \le \frac{c_z}{c_p + c_z} \le p \; y \le x_{opt.} \quad (3)$$

3   Results and discussion

While cocoa originated in Central America over 5000 years ago, it's popularity and production has spread globally. Cocoa powder and chocolate are made from the dried seeds that are found in pods on the cacao tree. [2] Cocoa is produced in countries within 10° south and 10° north of the equator.

Production of cocoa in the world

Global production of cocoa beans amounted to more than 4,5 million tonnes in 2016, increasing by an average 2,2% per annum between 2009 and 2016. Production is mainly concentrated in West Africa (66%). Although West African countries showed an average growth in production of 2,7% per year, they are facing increased pressure to supply the world market and are dealing with complex

economic, social and environmental issues of their own. Asia, Latin America and the Caribbean are other cocoa producing regions. Especially Latin America and the Caribbean showed good growth between 2009 and 2016 (5,2% per year). Asia saw a small annual decline (1,4%). [4]

The largest cocoa producing countries are listed in the graph 1 below. The processing of cocoa beans is predominantly undertaken in Europe and North America with the Netherlands and the USA as the leading countries. However, there has been a steady increase in cacao processing in other countries. [3]

Graph 1 **World cocoa production by country from 2012/2013 to 2016/2017 (in 1,000 metric tons)**
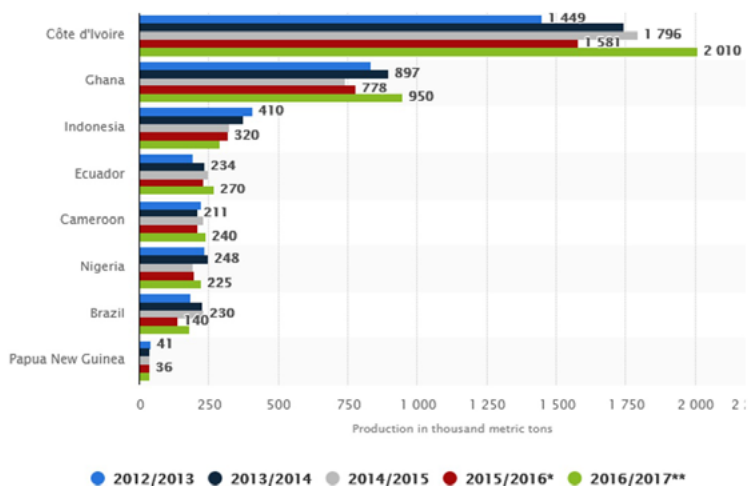
Source: Statista.

Africa is the largest producer of cocoa beans and accounted for 73% of global cocoa beans production where major production of cocoa beans comes from Ivory Coast and Ghana. Asia Pacific and Latin America are also plays an important role in the production of cocoa beans. Asia-Pacific accounts for 15% and Latin America accounts for 12% share of total cocoa beans produced in 2015. Major contribution of cocoa beans production comes from countries such as Indonesia, Malaysia and Singapore, which is likely to expand the business opportunities of cocoa beans in Asia-Pacific region. [1]

Consumption of cocoa in the EU and in Slovakia

Europe and America are the largest consumers of cocoa beans and cocoa-based products. Growing demand of cocoa beans in chocolate and food & beverage industry is fuelling the market growth in the regions. USA has the largest chocolate market and increasing demand for chocolate and chocolate flavoured products is increasing the demand for cocoa beans. Europe accounted for 42% revenue share of global cocoa beans market in 2015, owing to the high consumption of cocoa paste and cocoa butter in Germany, Belgium, The Netherlands and Russia. [1]

The European cocoa market offers good opportunities for developing countries. Europe is a dominant force in the cocoa sector, representing more than half of global cocoa bean imports. Furthermore, most beans are imported directly from developing countries, the Netherlands, Belgium and Germany being the largest importers. Europe comprises nearly 40% of the global cocoa-processing market. European cocoa grindings accounted for 1,3 million tonnes in 2016. European grindings decreased slightly, by an average of 0,8% per year, between 2010 and 2016. There was a significant drop in 2012, probably as a result of the economic crisis. The Netherlands and Germany are the two most important grinders in Europe. [4]

Graph 2 **Grinding shares of European countries, 2016, in %**
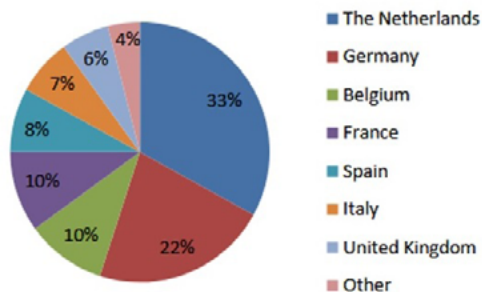
Source: Eurostat.

As we can see from the bar graph 3 consumption of cocoa powder in Slovakia has a rising tendency even though we have recorded a slight fall in the recent years. The highest value of consumption of the given commodity is recorded in 2007 with the value of 0,70 kg per inhabitant. The lowest value of consumption is recorded in the first years of the given period, specifically in 1990, 1991 and 1992, when the consumption of cocoa powder per inhabitant in Slovakia reached only 0,20 kg. As mentioned above, this rise can be explained by growing trend in production of chocolate products.

Graph 3 **Consumption of cocoa powder per inhabitant in Slovakia in kg**
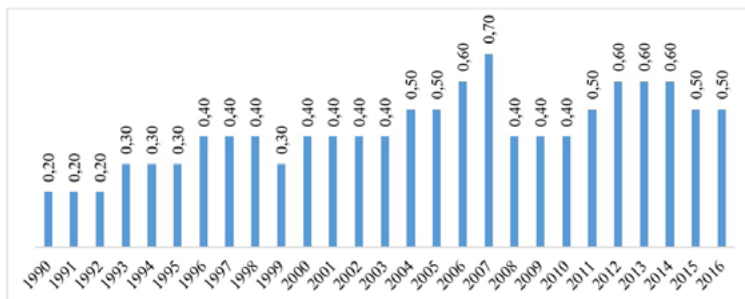
Source: Statistical Office of the Slovak Republic, database of DATA CUBE, own elaboration.

From the table 1 it is clear, that the value of correlation coefficient R = 0,836 shows relatively high dependence between the given variables and time. Coefficient of determination R^2 = 0,699, i. e. model is explained by 69,9% of the total variability. Based on p-value, which is smaller than 0,05 , we can assume that selected model as a whole was right. Quadratic trend was assumed by equation Y_t = 0,161 + 0,029t − 0,135t^2. The selected trend has statistically significant assumptions of parameters on the level of significance 5%.

Table 1 **Trend equalization of time series of cocoa powder consumption in Slovakia using quadratic trend**

Model Summary					
R	R Square	Adjusted R Square		Std. Error of the Estimate	
,836	**0,699**	0,673		0,075	
ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	0,312	2	0,156	27,815	**0,000**
Residual	0,135	24	0,006		
Total	0,447	26			
Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Case Sequence	0,029	0,008	1,747	3,756	**0,001**

Model Summary					
Case Sequence ** 2	-0,001	0,000	-0,973	-2,093	**0,047**
(Constant)	0,161	0,047		3,459	**0,002**

Source: Own elaboration.

Example of computing optimum amount of supply of cocoa powder

Let us briefly outline the situation that is discussed by the company's management dealing with retailing bio food products online in Slovakia. As the data is highly confidential, we are not allowed to name the company. After the research of the cocoa market the company has opportunity to import bio cocoa powder type Trinitario[1] from Mexico and therefore the management of the company wants to know what the amount of the supply of this kind should be, with expected costs which might emerge within decision to obtain a supply in the given amount. Total expected costs should, of course, be minimal.

There are specific limitations, as for transfer, storage, supplying and distribution of cocoa powder from Mexico. Within transfer it is possible to move only a product on palettes with the size of 800x1 200 cm, which are placed in cooled ship containers. Number of packages on one palette is 1 000 pieces, whereas one package contains 500 g of cocoa powder.

Acquisition price of one half – a – kilo package is 6,18 euro. Retailing price of one half – a – kilo package of cocoa powder is 10,50 euro. The company's management, taking into account the sale of similar products in the past, assumed probability of selling the analysed product which can be seen in the table 2. It is assumed that the highest probability is to sell approximately 9 800 pieces of cocoa powder packages.

Based on the given facts we computed optimum amount of the order of cocoa powder which should be 9 000 pieces. With this size of created supply the total expected costs will be minimum and their amount after rounding will be approximately 10 343 euro.

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[1] Trinitario plants are not found in the wild as they are cultivated hybrids of the other two types. Trinitario cocoa trees are grown mainly in the Caribbean area but also in Cameroon and Papua New Guinea. The mostly hard pods are variable in colour and they contain 30 or more beans of variable colour but white beans are rare. [2]

Table 2 **Basic information about expected sale of cocoa powder**

Number of customers who would buy the product	Number of packages of the product on a palette	Probability of sale
5 442	5 000	0,01
5 728	6 000	0,03
6 402	7 000	0,11
7 256	8 000	0,21
8 372	9 000	0,22
9 894	10 000	0,23
12 093	13 000	0,13
15 548	16 000	0,04
21 768	22 000	0,01
36 279	37 000	0,01

Source: Own elaboration.

4   Conclusion

To sum up we can proclaim that production of cocoa in the world is growing. The biggest producers are African countries (especially Côte d'Ivoire, Ghana), countries of Latin America (especially Brazil, Ecuador, Mexico, Peru) and countries of Oceania (especially Indonesia, Papua New Guinea). On the other hand, the biggest consumers of cocoa are European countries (especially the Netherlands, Germany, Belgium). The growth of production and consumption of this commodity reflects the growth of chocolate production and production of chocolate products in the world.

In Slovakia we have recorded a rise of cocoa powder consumption by 0,30 kg per person since 1990. Recently, consumption has stagnated and we do not assume a rise in consumption in coming years.

Nowadays Slovakia imports cocoa especially from African countries and countries of Latin America. The quality of cocoa powder is different. A customer in Slovakia has a possibility to buy lower quality cocoa as well as bio cocoa with a high level of quality. The quality indicator has an influence on the price of the given commodity on the market. Cocoa in Slovakia is retailing from 5 Euro per kilo to approximately 23 Euro per kilo. Price of cocoa in Slovakia is influenced by the world trade as well. In the graph 4 we can see how the price of cocoa per kilo developed in euro on the world markets from 31.1.2017 to 30.1.2018.

Graph 4 **Development of cocoa price on the world markets in kg from 31.1.2017 to 30.1.2018**

Source: www.kurzy.cz.

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SUBSTANTIATION OF COMPETITIVE STRATEGIES FOR THE DEVELOPMENT OF POULTRY INDUSTRY IN UKRAINE

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Abstract

The purpose of the article is to determine the intensity of competition on the eggs and egg products market, to systematize consumer requirements for egg products, to justify strategies for the formation and strengthening of the competitive advantages of products in the domestic and foreign markets.

Keywords: *competitive strategy, competitive advantages, industrial poultry farming, egg products, marketing tools.*

JEL Classification: *Q 18, M 11*

1 Introduction

Egg poultry farming in Ukraine is the most dynamic livestock industry, which, regardless of the season, using high-performance crosses, new resource-saving technologies, balanced diets, is able to produce products in large volumes and in the shortest possible time. A characteristic feature of the current stage of egg market development is the intensification of competition, which necessitates the enterprises of the investigated branch to substantiate strategies for ensuring stable positions on target segments in order to more fully meet the consumer demand for poultry products of the required quality, volume and range. It should be noted that in the production and trade of egg poultry products, the uncertainty of the effects of both external and internal factors, the multilevelness of sales channels, increased competition and over-consumption of the domestic market remain.

That is why the issues related to the substantiation of the strategic priorities of the development of the poultry industry are relevant.

2 Data and Methods

When writing the article, official statistics were used, reports from individual agricultural enterprises producing eggs, author's own research, processing of which was carried out by economic, statistical and analytical methods of research, ABC analysis - in assessing consumers and the product range in order to identify areas for strengthening competitive advantages on the market egg products, methods of marketing research, methods of expert evaluations, personal observations of the author and others.

3 Results and Discussion

In 2016, all categories of farms in Ukraine produced 15.1 billion units. eggs, which is 10% less than the level in 2015, including agricultural enterprises - by 1694.6 million, while households increased by 12.1 million units. The bird population in all categories of farms as of January 1, 2017 decreased by 2.3 million heads compared to January 1, 2016, including 2.2 million in agricultural enterprises, and 0.1 million in households the heads This circumstance is caused by a decrease in the volumes of exports of eggs and egg products. So, domestic agricultural producers in 2016 exported eggs in the shell for 45.49 million dollars. The USA is 1.7 times less than a year earlier. According to its data, exports in kind declined by 14.5% - to 50.68 thousand tons compared with 2015.

Export of dry and liquid egg products increased in 2016 - by 7.8%, to 3.57 thousand tons, in monetary terms, decreased by 1.6 times to $ 29.87 million. This is due to cases of avian influenza recorded in south-western regions of the country in December 2016 - January 2017. For certain objective reasons, export of eggs to Israel was prohibited. There was also a lost Iraqi market, which accounted for almost 50% of foreign supplies in 2015. The reason was the escalation of the conflict and the problem with the intersection of the Turkish-Iraqi border.

In addition, that decline in purchasing power led to a decrease in the consumption of eggs. Thus, consumption of eggs per person per year in 2016 in Ukraine amounted to 267 pcs. at a rational norm of 280 pcs. and that lower by 5% in 2015. [1]

As a result of the forced reduction in the number of poultry in the corporate sector of the agrarian economy (some livestock farms were planning unsuccessfully slaughtering of poultry to minimize losses) and due to increased exports,

they managed to reduce the supply of eggs in the domestic market. In January-October 2017, Ukraine exported 71.52 thousand tons of eggs against 50.68 thousand tons last year.

An important factor that has led to a decrease in the production of eggs in Ukraine, in particular by agricultural enterprises, is more than a hundred times lower profitability of egg production: from 60.9% in 2015 to 0.5% - in 2016.

Reduced profitability is the result of lower prices and higher costs. If in egg poultry farming costs increased by 63.3% compared to 2014, with an increase in egg prices by 64%. In 2016 there is an increase in costs by 23%, with a price drop of 9% [2]. The main factor of rising costs is the increase in the cost of the main types of grain crops from November 2015 to February 2016 by more than 50%. As in the cost price of poultry production, the share of feed is 60-65%, then, accordingly, this factor led to its increase. Influenced the industry and devaluation of the hryvnia negatively. In the foreign market, there is a tendency to decrease the export price. In particular, over the past 6 years, the average export price has decreased by 3.1%, the average price of fresh eggs in a shell, which is exported from Ukraine, in January-October 2017 amounted to $ 721 per ton. In terms of the UAH equivalent of about 12-13 UAH per ten [3].

According to the results of the conducted research 79 agricultural enterprises, or 51.6% of the total number of egg producers, in 2016, were damaged by the sale of egg poultry products. They occupy about 50% of the sales structure (Table 1).

Table 1 **Grouping of agricultural enterprises by the level of production and marketing of egg poultry production**

Groups by profitability, %	Number of households in group	Implemented, thsd.	Share of sales group, %	Productivity, pieces	Production cost 1 thousand UAH	Salesprice, UAH. per 1 thsd	Profitability, %
before -40	34	101,7	1,4	181	1804,38	1087,96	-37,7
-20	12	245,6	3,5	209	1251,37	949,40	-21,0
0	33	3113,1	44,2	184	1181,85	1119,08	-12,0
Loss-making	79	3460,5	49,2	186	1208,48	1106,13	-13,7
20	51	2849,9	40,5	265	934,48	1141,40	15,9
over 20	23	727,1	10,3	302	912,30	1051,49	35,9
Profitable	74	3577,0	50,8	272	929,78	1123,13	19,2
of all	153	7037,5	100,0	222	1064,76	1114,77	0,5

The largest egg and egg producer in Ukraine, Avangard agroholding, in 2016 gained 56.6 million dollars. Net loss, which is almost three times less than in 2015.

According to a company report on the London Stock Exchange website, the company's revenues last year dropped by 17% compared to 2015 - to $ 191.3 million. Gross profit "Avangard" in 2016 decreased by 40% - to 13.2 million dollars.

In the reporting period, the operating loss of the holding decreased by 5.8 times and amounted to $ 14.9 million. Avangard reduced revenues from exports by 29.9% to $ 66.7 million. At the same time, the share of export earnings in the net income of the holding was reduced to 35% from 41% in 2015.

However, 74 farms of the corporate sector of the agrarian economy - producers of eggs at the expense of domestic reserves, in particular higher productivity of hens - bearers, lower level of cost, ensured the profitability of production economic activity.

A rather important factor in ensuring the profitability of productive and economic activity is a reduction in the price level when sales volumes increase, which is characteristic of the 5 groups of agricultural enterprises. In our opinion, these entities also include the enterprises of the corporate sector of the agrarian economy, which are part of the company Ovostar.

Companies are starting to fight for the share of the domestic market. Manufacturers are actively engaged in the diversification of sales markets. Such actions helped Ovostar reduce the average sales price by only 15%.

According to the results of 2016 the company reduced Ovostar's net profit by 1.8 times compared to 2015 - to 12.219 million dollars. USA. The revenue of "Ovostar" increased by 1.7% - to 53.665 million dollars. In the United States, gross profits declined by 26.3% to USD 16.26 million.

A characteristic feature of egg production in agricultural enterprises is the high level of its concentration. During 2012-2016 there was an increase in the level of monopolization of the poultry market. Thus, in 2012, more than 90% of the eggs were occupied by 47 agricultural enterprises, in 2016 - 29 (Table 2).

Table 2 **Grouping of agricultural enterprises according to the volume of sales of eggs**

Groups by volume of sales of eggs, thousand pcs	2012			2016		
	Number of house-holds in the group	Group share in implemen-tation, %	Profita-bility, %	Number of house-holds in the group	Group share in implemen-tation, %	Profita-bility, %
before 1	84	0,09	-28,0	75	0,2	-18,0
10	44	1,87	-5,9	26	1,9	1,6

Groups by volume of sales of eggs, thousand pcs	2012			2016		
	Number of house-holds in the group	Group share in implemen-tation, %	Profita-bility, %	Number of house-holds in the group	Group share in implemen-tation, %	Profita-bility, %
20	13	1,65	-0,4	12	2,5	1,0
50	17	5,21	-2,0	11	5,9	9,4
250	30	30,86	28,1	26	39,4	4,2
more 250	17	60,31	78,0	3	50,1	-2,8
all	205	100,00	52,6	153	100,0	0,5

Farms of the corporate sector of the agrarian economy 6-7 groups are, in our opinion, the main players in the market for egg poultry production, in particular the Ovostar Union group of companies, Agroholding Avangard, Inter-Agrosystems, Lundhut Ukraine

We have determined the concentration index for the three largest poultry farms in the egg sector (by volume of sales). Thus, in 2005 three enterprises sold 12.4% of all eggs, in 2012 - 20.3%, and in 2016 - 50.1%, which indicates an increase in the concentration and monopolization of the market. For the sake of clarity, we will construct a Lorentz curve that reflects the uneven distribution of any sign, for the case of the concentration of vendors on the market and shows the relationship between the percentage of enterprises in the market and the market share, calculated on the rising sum from small to large commodity producers (Figure 1).

Figure 1 **Lorentz curve of distribution of concentration of poultry enterprises in the market ofeggs (1 straight line for absolutely uniform particle distribution, 2 - curve line - actual Lorentz curve)**

Source: Calculated by the author.

770
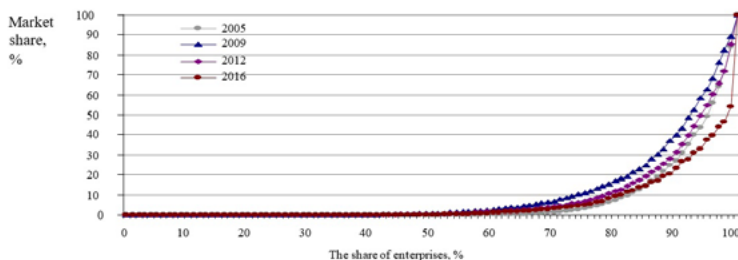
We have systematized opportunities and strengths, threats and weaknesses for the domestic egg poultry industry based on the SWOT analysis (Table 3).

Table 3 **SWOT-analysis of the development of marketing activities of enterprises in the egg market**

Opportunities	Threats
1. Promising development by increasing the competitiveness of products on the basis of modernization and development of traditional and new brands. 2. Use of the advantages of the geographical location of the country. 3. Effective use of resource potential in poultry farming. 4. Obtaining synergistic effect from the development of vertical integration in egg poultry farming. 5. Creation of additional workplaces with expansion of capacities	1. Seasonal production and consumption of egg poultry products. 2. Strengthening of the signs of financial instability in the vast majority of small poultry farms. 3. Increasing competition from agroholdings. 4. The threats of bankruptcy for 124 small and medium-sized poultry farms. 5. Lack of the mechanism of insurance of industrial risks. 6. High risk of spreading of viral and infectious diseases. 7. There is a high probability of manifestations of manipulative actions of producer leaders in the market regarding the level of prices
Strengths	**Weak sides**
1. Favorable climatic conditions of the development of the industry for growing fodder grain. 2. Availability of a full range of domestic forage crops for the development of poultry farming. 3. Availability of highly skilled personnel in the industry. 4. There is a significant potential for the production of dietary and table eggs and their processing products. 5. Possibility of deep processing of eggs and expansion of the product range. 6. Use of innovative technologies. 7. Lobism of state authorities. 8. Development of vertical integration in the industry. 9. Favorable geographic location, developed transport infrastructure	1. Low development of complex processing of technological waste (feather, shell eggs, poultry litter) for the purpose of obtaining various products of forage, medical and technical purposes. 2. Insufficient provision of feeds of own production. 3. Unsuccessful state of breeding work and ensuring the conservation of bird's stock. 4. Lack of development of the marketing, sales and advertising system. 5. Difficulties in ensuring compliance with national quality and safety standards internationally. 6. Strengthening the market monopolization of eggs and egg products. 7. Insufficient resolution of the problem of bird droppings disposal. 8. The deterioration of social conditions of poultry workers, social consequences of the closure of small poultry farms. 9. Ecological threats from the concentration of poultry

Source: Summarized by the author.

In the segment of fresh eggs, a high degree of standardization, the brands of different commodity producers are almost identical, the big difference between them is not seen by consumers. The loyalty of the brand is most affected by the "locality" factor of the origin of the commodity producer. The segment of fresh eggs can be attributed to monopolistic competition with a wide range of products, a large role of marketing tools such as brand, packaging, marketing methods, and the segment of egg products to the oligopolistic market, which also plays an important role in the competition is a marketing complex [4].

Economies of scale on the market are modest, as all companies have virtually identical production and sales costs.

The consumer's loyalty to the brand on the market for fresh eggs is very low. An important factor in the choice of a commodity producer is the price, further with a large margin factor of the "locality" of the commodity producer.

In the near future, it is likely to predict the growth of competition in the industry, as growth in output will surpass demand growth.

In the conditions of slowing the growth of demand, uniformity of the commodity position and the absence of the possibility of emerging competitive advantages at the expense of marketing tools, as a way to strengthen their competitive positions, the main commodity producers can use the following strategies: the absorption of small commodity producers or mergers with equal opportunities and competitive force; search for new market segments.

The impact on competition in egg poultry production of new commodity producers, that is, those entering the market, will be examined on the basis of separate characteristics of this force: economies of scale in the industry are not significant, the share of constant costs is relatively small, to obtain savings on the purchase of the main raw materials (grain group, sortoids of oilseeds) is impossible because they are a classical commodity; free access to technology makes this factor insignificant; low customer loyalty to brands simplifies the process of reorienting the end user; the price is an important factor in the choice of a particular brand by the buyer, so new producers are actively using the dumping policy when bringing their brands to the market; access to the distribution channels for new commodity producers may be complicated by the already established relationships with egg suppliers.

Taking into account the above-mentioned factors, as well as slowdown of consumption growth and strengthening of monopolization, the factor of competition of new commodity producers should be considered to be low in value.

It is possible to carry eggs of other types of poultry to substitute products. Given the lack of traditions of widespread demand for these products, the lack of

awareness of the population about them, their impact on the market for chicken eggs is insignificant.

Chicken eggs are the most available of all kinds, and the degree of exposure of substitutes to the B2C market is practically absent. However, it can increase in the B2B market in the conditions of significant increase of prices and search for commodity producers to reduce the cost of their products.

Regarding the competitive force of suppliers, it is necessary to consider that individual components of feed ingredients are imported, which requires the establishment of competitive logistics; the main component of feed is a grain group that is characterized by high demand in the foreign market, there is an instability of prices throughout the year. The above shows the significant influence of the factor considered by us.

Competitive strength of customers has the following characteristics: the concentration of buyers in the market is poorly expressed, since sales are too differentiated. However, over the last few years there has been a tendency towards a decrease in the total number of buyers due to increased supply to several large suppliers. First of all, this is due to the active development of retail chains and the exit from the market of small and inefficient [5.]. Terms of work with wholesale and retail networks are increasingly complicated, which affects the sales efficiency of commodity producers. Probably this trend will continue in the near future, which will increase the negative impact of this factor.

As is known, in the segment of fresh eggs, the product is not sufficiently differentiated, the buyer easily moves from consumption of one brand to another. In egg processing segments, the use of such marketing tools as branding and the proper management of the product range can contribute to increased customer loyalty. The factor of buyers can be attributed to the average for weight.

An analysis of the competitive environment of the commodity producers' activity of the branch we examined identified the following possible strategies of behavior in the market: active policy in the market of mergers and acquisitions; an increase in the share in advanced markets for egg processing; further diversification of sales; strengthening the marketing activity of commodity producers.

Let's consider the main driving forces and their influence on the competitive environment in the field of egg poultry farming. First, it is the introduction of new products. Despite the fact that the investigated industry does not belong to innovation, commodity producers are oriented towards expanding assortment at the expense of well-known abroad production, but which have not previously been used in domestic practice: egg production, "biosaites", feed for poultry, biogas and organic fertilizers on the basis of chicken litter. The novelty of the segment

involves a higher rate of return for the enterprises that will be the first to come out of it. Accordingly, this may be an additional competitive advantage.

Secondly, the change in the system of marketing tools. Increasing monopolization in the market leads to an increase in marketing budgets. Part of the egg and egg producers are investing in branding, others are active in advertising campaigns and regular BTL- events. Even advocates of conservative marketing strategies recognize the need for increased marketing activity. This is very important in egg processing segments, where marketing factors play an important role.

Thirdly, a change in public values and lifestyles. With the growth of the welfare level, Ukrainians will pay more and more attention to a healthy lifestyle. The right theme for healthy life in the position of importance and the need to eat eggs and egg products can be an additional competitive advantage. However, account should be taken of the negative effects of the global financial crisis and manifestations of the signs of the crisis in the domestic economy. In general, consumers' well-being may decrease, which may lead to lower incomes and a change in the structure of consumption towards cheaper products.

Fourth, the change in the long-term trends in the sector's economic growth. Since the segments of fresh eggs are in the transitional stage of the life cycle - from maturity to saturation, the long-term trend is to slow down the growth of the industry, which will lead to the crowding out of small, inefficient commodity producers, further consolidation of holdings and redistribution of the market in favor of more efficient companies.

The influence of all other factors on the change in the structure of the competitive forces is much smaller.

The characteristic features of the Ukrainian market of egg products can be called: the market is not sufficiently saturated by domestic products, due to the low level of quality of certain types of products (for example, albumin). Experts estimate that segments of egg products have significant potential for development; With the growing competition, the role of branding will grow; most commodity producers are inert in shaping the new needs of B2B market consumers by producing innovative products or original positioning ideas that will shape opportunities for the development of new market segments.

Consequently, the current market situation is characterized by a high level of competition and the positioning of the market as saturated with growing export orientation and the emergence of periodic risks of overfishing. In these conditions, with fairly intensive production, the competitive advantages of poultry farms can be formed and maintained exclusively through increased marketing, which requires the adaptation of scientific approaches to the assessment and forecasting of demand, pricing, consumer motivation, and the introduction of

marketing strategies. Note that small regional and local egg producers are not observedcomplex approaches to the use of a set of marketing tools.

In the study of purchasing power of consumers in the market for fresh eggs, it was found that about 90% of respondents are satisfied with the range offered in retail trade. Most consumers prefer selected eggs (56.3%) and the first (31.2%) categories, regardless of diet or table eggs (68.0%). Respondents (55.3%) do not care about the color of the shell, 18.6% of the respondents only buy brown eggs, 10.9% - only white. The vast majority of respondents agree to buy home and with different biological additives for eggs.

It is established that in the domestic market, with the position of such products as chicken eggs, the idea of healthy eating is actively used - practically by all manufacturers on the market. Leaders such as "Avangard" and "Ovostar Union" offer consumers eggs enriched with omega-3 fatty acids or iodine. However, it should be noted that the share of branded egg products in the market is very small, among distinguished consumers of brands it is possible to distinguish the TM From Good Chicken (Lundhut Ukraine), TM Yasensvit (Ovostar Union), TM «Kvochka» (company "Avant-guard") [6].

One of the most important elements of the marketing complex is price policy, as a set of measures and strategies for managing prices and pricing, setting goods for such prices, which correspond to the costs of production and promotion of goods, market conditions and provide profit to the enterprise [7].

Based on the foregoing, we substantiated the competitive strategies of the main producers of chicken eggs and egg products (Table 4). The evaluation of marketing activities of leading poultry farming holdings shows that they all try to manage the marketing complex through specialized functional units, while others concentrate marketing efforts only on sales organization. At the same time, the research of the market for eggs and egg products, the study of the behavior of competitors is practically not involved in the marketing system, not to mention market strategies and tactics of competition. As a result of this, there are significant financial losses of poultry enterprises during the seasonal peaks, changes in the purchasing power of the population and the re-loading of commodity flows.

Table 4 **Characteristics of competitive development strategies in the market for egg poultry production by individual commodity producers**

Poultry enterprises	Strategic priorities	Goals to achieve market share	Competitive position	Type of strategy	Competitive strategies
Avangard Company	Leader in the field	Aggressive expansion through the acquisition of other commodity producers and domestic growth	Strong position	Mainly offensive	Focusing on national and regional sales, targeting a wide range of consumers
Inter-Agrosystems Company	Enterprise with a strong position	Increasing and maintaining the existing market share	Increasingly	Mainly offensive	Focusing on market niches of consumers with different levels of income, product differentiation, image enhancement, reputation and quality
Ovostar Company	Enterprise with strong position	Increase and maintenance of existing market share	Well protected and strengthened	Mainly offensive	Focusing on market niches of consumers with different income levels, differentiation of commodity offer based on deep processing of eggs, image, reputation and quality
Company "Lundgut Ukraine"	Enterprise with a strong position	Retaining the existing market share	Tries to strengthen its position	Combined strategy of defense and offensive	Orientation to a wide range of buyers, focusing sales in the region

Source: Compiled by the author.

Consequently, egg poultry farms, which have retail outlets in cities but without self-processing eggs, are cost-effective, can use such price strategies that enable them to strengthen their competitive position in the market and increase their income. The latter can use the implementation of such strategies as "penetration", "price alignment," "accelerated return of funds." However, the lack of self-processing of agricultural products, which is typical for most agricultural enterprises, constrains access to the food market, allowing them to consolidate only in limited segments. The limited supply of goods and the saturation of the market forces these companies to sell to a broker or a processing enterprise or to enter into the integration structures, performing the role of "milk cow".

4   Conclusions

Thus, the operation of Ukrainian poultry enterprises on the target segments of eggs and egg products requires taking into account the fact that the market is constantly developing dynamically. In order to adapt to changes in market conditions and to continue the successful operation of the enterprise, it is necessary to take into account numerous factors at all stages of marketing management and provide a flexible adaptation of the enterprise to their changes. The manifestation of adaptation of enterprises to changes in the factors of the functioning environment are marketing tools, among which the important place is given to product strategies, ensuring product compliance with market requirements, marketing communications, which contribute to the growth of sales.

The main areas of the formation of competitive advantages by egg poultry enterprises are: introduction of new products. (egg production, "biosaites", poultry feed, biogas and organic fertilizers based on chicken manure); activating instruments for the formation of demand and stimulation of product sales; taking into account the changing behavior of consumers, in particular, a healthy lifestyle; taking into account changes in the long-term trends in the development of the industry (since the segments of fresh eggs are in the transitional stage of the life cycle, from maturity to saturation, the long-term trend is to slow down the growth of the industry, which will lead to the crowding out of small, inefficient commodity producers, further consolidation of holdings and redistribution of the market to the benefit of more efficient companies.

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COMPETITIVENESS INCREASE OF MILK PRODUCTION IN UKRAINE

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Abstract

The current state of milk production in Ukraine has been analyzed and the main directions of products competitiveness increase have been determined. It has established that the highest level of competitiveness of milk production in Ukraine belongs to enterprises with number of cows 500 to 1500 and their annual productivity of over 6000 kg of milk. The main directions of milk production competitiveness increase in Ukraineare introduction of innovative technologies of milk production, further development of international markets and implementation of international quality standards in the process of production, processing and products marketing.

Keywords: *competitiveness, production, milk, agricultural enterprises, costs, market, estimation*

JEL Classification: *E23, Q56, Q57*

1 Introduction

Favorable agricultural and climatic conditions of Ukraine provide agricultural enterprises with a significant competitive advantage in milk production. However, the competitiveness of milk production is determined not only by agricultural and climatic conditions but also by the availability of technical, technological, economic and organizational conditions for the production and sale of products. The outdated material and technical base, underdeveloped branch infrastructure, the lack of flexible system of scientific, technical, production, material and technical, commercial cooperation both within the industry and with other branches of the country, determine the low level of milk production competitiveness.

The main problems that currently exist in animal husbandry and need to be solved are the following: reducing the number of cattle and production volumes; low quality of milk to be processed; a drop in the demand for dairy products in the domestic market and a decrease in their export; low milk production efficiency; imperfect system of breeding and reproduction of a herd and ineffective mechanism of its state support; low level of scientific support of innovative production technologies introduction; inconsistent state support to industry development, etc. Solving these problems requires the development and the implementation of effective program for milk production competitiveness increase, which would include a system of measures for production, marketing, organizational, financial-investment and information support.

2 Data and Methods

Competitiveness of products is determined by their competitive advantages. The concept of competitive advantage reflects those characteristics and properties of products that form a certain advantage for the enterprise over its direct competitors. The theoretical aspects of product competitiveness and competitive advantages were described in details in the publications of foreign scholars (Porter, 1985; Prahalad, 2005; Russell & Taylor, 2006). Issues of methods for agricultural products competitiveness assessment were presented in the works of Ukrainian scientists (Kvasha & Holomsha, 2006; Yankovyi, 2006) and others.

At the same time, the problems of intensification, concentration, specialization of production, milk and dairy products market conditions on the efficiency of milk production and selection of effective areas for competitiveness increase and formation of competitive advantages of agricultural commodity producers haven't been studied sufficiently.

Purpose of the article is to assess the current state of milk production in agricultural enterprises, to identify the factors that shape the products competitiveness, to justify the approaches to choosing effective ways to increase milk production competitiveness in Ukraine.

3 Results and Discussion

Increasing milk production competitiveness is a process that needs to be managed on the basis of strategic approach. To build an effective system for managing the products competitiveness, it is necessary to identify and analyze the whole system of factors of products competitiveness, their interconnection and interaction both in the production process, and in the domestic and foreign markets.

During 2000-2014, the volume of milk production in Ukraine in all categories of farms decreased by 18.0% from 12.7 million tons to 10.4 million tons (Table 1).

Table 1 **The main indicators of milk production in Ukraine, 2000-2016**

Indicator	Year						2016 (in %) till 2000
	2000	2012	2013	2014	2015	2016	
Number of cows, thousand heads	4958.3	2554.3	2508.8	2262.7	2166.6	2108.9	42.5
Including: in agricultur-alenterprises	1851.0	575.2	565.4	529.2	505.1	484.6	26.2
in households*	3107.3	1979.1	1943.4	1733.5	1661.5	1624.3	52.3
Milkproduction, thousandstons	12657.9	11377.6	11488.2	11132.8	10615.4	10381.5	82.0
Including: in agricultural enterprises	3668.7	2535.3	2582.5	2647.5	2669.2	2705.6	73.7
in households*	8989.2	8842.3	8905.7	8485.3	7946.2	7675.9	85.4
Sold milk by agricultural enterprises, thousand tons	2683.7	2277.7	2325.1	2505.7	2538.3	2507.9	93.4
Profitabilitylevel (+), losses (-) of milk production, %**	-6.0	2.3	13.6	11.0	12.7	18.6	x

*Households include family farms of 1-2 hectares of agricultural land and, depending on the circumstances, 1-3 cows
**Indicators are calculated for agricultural enterprises
Source: According to the State Statistics Committee of Ukraine.

During this period, the volumes of milk production in agricultural enterprises decreased by 26.3%. In the households the vast majority of milk is produced 73.9% of its total volume in 2016.

The main reason for milk production decrease in Ukraine is the reduction of cow numbers. According to the State Statistics Committee of Ukraine for the period of 2000-2016, the number of cows in Ukraine decreased by 57.5%, and in agricultural enterprises – by 73.8%.

The number of enterprises engaged in milk production decreased from 3741 to 1485 in 2010‑2016. However, there is also a concentration of milk production. If only 44 enterprises had more than 1000 cows in 2010, then in 2016 – more than 70 enterprises.

The level of milk marketability in Ukraine is quite low. If agricultural enterprises implement about 93% of the produced milk, then the economy of the population is only 23.0%.

The existing volumes of milk production over the last years in the range of 10.4 – 11.1 million tons provide the consumer demand of Ukraine's population in dairy products, on average, at 210-220 kg per person annually. During 2013-2016, the structure of dairy products has undergone significant changes caused by the declining of population purchasing power. The volume of cheese production was decreased by 32.3%, while the share of butter, cream, dry skim milk and casein was increased. The structure of export has also changed. Thus, the share of different sorts of cheese (from 10% to 6%), condensed milk, and dairy products has significantly decreased. However, sales of butter to the external markets have increased by 3.7 times, dry milk – by 2.2 times, technical casein – by 73%. At the same time, the import of dairy products has decreased because due to devaluation of hryvnia imported dairy products are becoming more expensive (Ilchuk & Konoval, 2016).

The devaluation of national currency in 2014 and the decline in demand for dairy products in the domestic market associated with a decrease in population purchasing power led to price reducing for dairy raw materials in dollars in Ukraine in the 2nd quarter of 2015 to 19 cents/kg (Average Monthly Prices of Milk in some Countries of the World, 2016). Milk production with significant number of enterprises has become unprofitable.

The stop of price falling for milk (in dollar equivalent) can be reached only by increasing the volume of its exports. The most promising markets are the markets of Asia and Africa, which are determined by high demand compared to European countries, where Ukrainian dairy products are not sufficiently competitive due to low quality of dairy raw materials, technological backwardness and low loading of the majority of milk processing enterprises. However, Ukrainian producers can compete with foreign producers in terms of the cost of milk production and its purchasing price (Figure 1).

Figure 1 **The average price of dairy raw materials in some countries of the world in 2016, Euro/t (in terms of milk fat content 4.0% and protein content 3.4%)**
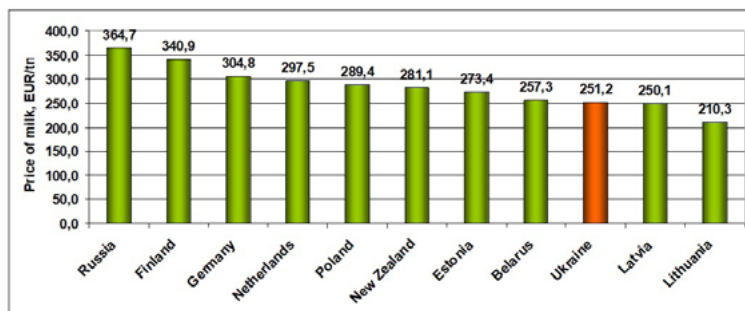
Source: http://milkua.info/uk/world-milk-prices/index?page=1.

In order to increase the competitiveness of milk production in agricultural enterprises it is necessary to implement complex and systemic measures that will ensure increase of cow productivity, high efficiency of production and improvement of dairy products quality.

The development of directions for products competitiveness increase involves the development of concrete measures for competitiveness increase and determining the total expenses necessary for their implementation. When choosing effective areas for competitiveness increase, it is important to determine the impact of the implemented measures on the level of products competitiveness and on the formation of agricultural enterprise's competitive advantages.

An important factor in competitiveness increase of milk production is the concentration of livestock animals on farms and the high proportion of large enterprises in the structure of milk production (Table 2).

The concentration of production makes it possible to apply scientifically developed technologies for cattle keeping and feeding, to introduce effective, rational technical means for the complex mechanization of all production processes, to use highly productive breeds of animals.

Table 2 **Grouping of agricultural enterprises in Ukraine in terms of milk sales, 2016**

Indicator	Groups of enterprises according to the amount of sold milk, tons					Total
	till 500	500-3999	4000-7499	7500-10999	More than 11000	
Number of enterprises	636	650	93	31	27	1437.0
Number of cows, thousand heads	57.0	200.6	80.6	42.1	81.4	461.7
Number of cows per enterprise, heads	89.6	308.7	866.5	1357.8	3016.4	321.3
Milk production, thousand tons	163.7	1073.3	553.8	304.6	565.6	2661.0
Sold milk, thousand tons*	134.7	980.2	522.6	295.2	543.5	2476.2
Annual milk production per cow, kg	2874	5349	6872	7237	6945	5763.3
Production cost 1 ton ofmilk, UAH**	4222.2	4096.7	4241.9	4169.4	4164.2	4157.4
Production costs per cow, UAH	12136	21915	29267	30175	28920	23960
Total cos of 1 ton of milk, UAH	4577.6	4472.9	4634.6	4475.2	4991.0	4626.7
Sales price of 1 ton of milk, UAH***	4663.0	5291.6	5486.1	5787.7	5778.1	5464.5
Profit for 1 ton of milk, UAH	85.4	818.7	851.5	1312.5	787.1	837.8
Profit, totalmil. UAH	11.5	802.5	445.0	387.5	427.8	2111.5
Level of profitability, %	1.9	18.3	18.4	29.3	15.8	18.1

* Milk was sold in terms of fat content of 3.4%, protein – 3.0%.
** In 2016, the average rate of 1 Euro was 28.4 hryvnia.
*** The price of milk sales is tax-free.
Source: Calculated by the authors according to the statistical form № 50 – agr.

The data in Table 2 show that as the production concentration and milk sales in agricultural enterprises of Ukraine increased in 2016, the cow productivity and economic efficiency increase of milk production was taken place. During the study, it was found that the highest level of milk production competitiveness is observed in enterprises with the total number of cows 1000-1500 heads. They had the highest level of productivity and the selling price for 1 ton of milk, the amount of profit per 1 ton of milk. The sources of competitive advantage in these

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enterprises are, first of all, the scale of production and the saving of feed costs by means of using by-products of plant growing and processing products.

An important factor in milk competitiveness increase in agricultural enterprises is milk production increase per cow. Despite the fact that during the period 2000-2014, the average annual milk production increased by almost 3.2 times, but it remains insufficiently high. Therefore, the main strategic direction of cattle breeding is raising the dairy herd productivity. Primarily, illnesses and barreners, insufficient feeding, drawbacks in production organization and breeding business cause low productivity of cows.

The competitive situation of the market has a significant impact on the competitiveness of milk production. The study of the dependence of demand, market capacity and volumes of dairy raw materials sales by agricultural enterprises in Ukraine was carried out using methods of economic and mathematical modeling. To construct mathematical models of demand and supply in the market for dairy raw materials the database of State Statistics Committee of Ukraine was formed on the basis of statistical reporting of agricultural enterprises, reported on form № 50 – agr. in 2013 and 2016 was used .

The mathematical function of the supply curve for dairy raw materials in 2013 was the following (formula (1)):

$$y = 2376,39 + 32,06^x, \tag{1}$$

where x – amount of supply, million tons;
       y – producer price, UAH/t.

The coefficient of determination in this case was 0,793.
The mathematical function of the supply curve for dairy raw materials in 2016 was the following (formula (2)):

$$y = 3733,34 + 38,32^x, \tag{2}$$

The coefficient of determination in this case was 0,786.
The price of market equilibrium was established on the basis of making supply and demand curves (Figure 2).
To model the behavior of dairy enterprises, a linear function of general type was used:

$$Y = a - bp ,$$

where Y – volume of consumption of dairy raw materials, tons;
       p – consumer price, UAN/ton.

Figure 2 **Formation of demand and supply volume of dairy raw materials of industrial production in Ukraine in 2013 and 2016**
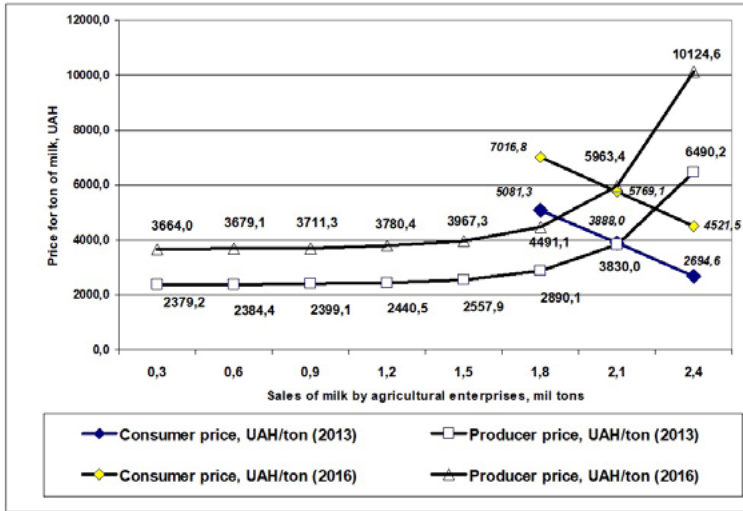
Note: In 2013 the average rate of 1 Euro was 10.39 hryvnia, in 2016 – 28.4 hryvnia.
Source: Calculated by authors according to the statistical form № 50 – agr.

The demand line for dairy raw materials in 2013 was the following (formula (3)):

$$Y = 3,38 - 0,00034*p. \tag{3}$$

The demand line for dairy raw materials in 2016 was the following (formula (4)):

$$Y = 3,08 - 0,00025*p. \tag{4}$$

The results of the study have shown that agricultural enterprises sold 9.0% of products with loss from the total volume of dairy raw materials (taking into account the Value Added Tax refund), and 16.3% in 2016. The calculations have shown that in order to keep the purchase price of milk in 2016 at 289.4 Euros/ton (the average price level in Poland), Ukraine would have to export about 48-50 thousand tons of milk monthly to 36.2 thousand tons of milk and dairy products in recalculation on milk.

An important factor affecting the competitiveness of milk is the cost of its production. Figure 2 indicates that the production costs of 1 ton of milk in Ukrainian agricultural enterprises corresponded to average European level and amounted to about 286.0 Euros in 2013, while in more efficient enterprises milk was produced

for 230-250 Euros/t. In 2016, mainly due to the devaluation of national currency in 2014-2015, the production cost of 1 ton of milk in Ukrainian agricultural enterprises amounted to 162.2 Euros on average, while more efficient enterprises produced milk for 130-140 Euros/t. In the structure of milk production costs in agricultural enterprises of Ukraine the largest share is occupied by feeds – 50-55% and labor costs 12-20%. The share of oil products costs is 4-7%, depreciation is 3-6%, deductions for social measures – 4-7%, services payment – 3-5% of total milk production costs.

An important direction for milk production competitiveness increase is the investment activity of enterprises, which includes: construction of new and reconstruction of old typical cowsheds using highly productive breeds of cattle; introduction of energy-saving technologies of feed production, cattle keeping and feeding; application of effective milking systems and herd management; compliance with regulatory requirements and principles to control production and products quality.

The results of research have shown that at the current purchasing prices for milk in Ukraine, the payback period of investments in the construction of dairy farms is more than 12 years old, and in the reconstruction of dairy farms – more than 9 years. With purchasing prices increase in Ukraine to the level of prices in the EU, the payback period of investments in the construction and reconstruction of dairy farms would be about 6-8 years (Ilchuk, Konoval, Radko, and Yevtushenko, 2017).

4   Conclusion

Thus, the main reasons for milk production decrease in Ukraine are: the drop in demand for products in the domestic market due to the reduction of population purchasing power; the loss of part and the impossibility of rapidly reorienting to new foreign markets for milk and dairy products due to the poor quality of its raw materials; high capital intensity of the industry compared to other branches of agriculture and the long payback period of investments.

The main directions of milk production competitiveness increase in agricultural enterprises of Ukraine are: development and implementation of measures on harmonization of legislation in the field of food hygiene and approximation to the EU legislation in the field of food chain tracking "from the lawn to the table"; the transition to modern technologies of cows keeping, milking and dairy raw materials cooling timely; construction and reconstruction of large modern dairy complexes; improvement of forage production and strengthening of forage base;

promoting the development of integration processes in the country's milk and product subcomplex, etc.

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COMPARISON OF WINE PRODUCTION AND CONSUMPTION: CASE STUDY OF SLOVAKIA AND CZECH REPUBLIC

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Abstract

Wine production has a long tradition over the years and significant position in many countries in central Europe. Nowadays, in terms of stable production & customer demand, it is very difficult to build strong competitiveness and attractiveness. The main objective of this paper is exploring the comparative study of wine production and consumption in a Slovakia and Czech Republic. Furthermore, this paper presents the wine situation from macro view and impact on domestic and foreign markets. A comparative study based on the past development and current situation. All data were obtained from statistical databases and green reports. Nowadays, Slovak and Czech's winemakers produce wines of the high quality with a fair price. Last 20 years wine consumption has a slightly rose in both countries. However, wine production is insufficient for the domestic market and wine is needed to be imported from abroad. Hence, the paper focuses also on a recommendation for a better position on the wine market in Slovakia and Czech Republic. The added value of the comparative study is significant to understand the causes of the wine production situation and consumption of wine products at the markets.

Keywords: *Czech Republic, comparison, consumption, Slovakia, wine production*

JEL Classification: *E 21, E23*

1   Introduction

Wine culture has significant position in the economies of several countries. It is closely linked with economy of country and moreover it fulfils the regional potential of country in traditional growing of wine grapes and cultural development of population. Anderson et al. (2003), Anderson & Nelgen (2011), Mariani et al. (2012) think that last decades have been important for wine. This commodity has become global consumed product, which influences traditional vinicultures and consumers by its being. Global wine production in 2016 according to OIV, (2016) is estimated at 267 mhl.. where European Union remains by far the world´s largest market as well importer and exporter (Italy, France, Spain, others European countries), and countries of New world (USA, China, Chile, South Africa, Australia, New Zealand). Each country has its own differences in volumes from one harvest to another, nevertheless the world's consumption of wine is in position of inferior in comparison with world's production. This leads to accrued compression on wine producers to face the problems with grow and development of market. Remaind & Couderc (2006), Resnick (2008) point out that countries of so-called "Old world" are focused on production, whereas countries of "New world" are concentrated on marketing and sales. Svobodová, Věžník, Král (2014) argue that in a wine producing countries can be seen that there are qualitative changes in wine-producing sector. One of all questions is the core of consumer's problems. They have started to put the importance on preferring background in certain area or name of wine-producer. Consumers became picky and they started to care less of a price. This change of consumer's behaviour to traditional or typical groceries we can see even in recent agricultural literature, which was explained by Barham (2003). On the other hand, some of the consumers decide to buy rather cheaper and the same quality wine from New World countries in comparison with European wines. Wine culture has transformed, in all over the world measurement, from quantitative to qualitative production (Dougherty, 2003; Jones, 2003; Pitte, 2004; Tomšík a Prokeš, 2011). As Rebič and Horská (2017) claim, wine is very important product for Slovak Republic, which is traded and is exported commodity annually. They state another aspect as well. In their opinion, wine is not only product honoured from historical point of view, but the resuming history and traditions of Slovak heritage as well. Slovakia is known for huge amount of small local wine producers, who compete against the international corporations. They are able to compete with their wine quality and long-term fame and brand on domestic and international market as well. It is expected that the quality of Slovak wines will be part of the best wines in Europe. The pressure on domestic wine producers for high-quality production and care for grapes develop increasing demand for

high-quality wines and availability of wide range of foreign wines (Svobodová, Věžník, Král, 2014). On the other hand, Prokeš & Tomšík (2012) claim that Czech wine industry has gone through several reforms and it has moved from quantitative production to qualitative for recent twenty years. Šrédl, Kučírková and Svoboda (2017) affirm high quality of Czech wines, which are accomplished by being successful at international competitions.

2   Data a methodology

Methodology is based on the description of wine sector's situation in Slovakia and Czech Republic. This paper is focused on evaluation of differences in wine sector, to be concrete, the way of growing wine grapes and wine production. Another topic of this paper is to identify consumer's preferences in countries in neighbourhood. Identification of this development in certain time period should allow countries to be more self-sufficient in wine production and satisfy consumer's needs on the domestic market. On the basis of this analysis we are able to define Slovak and Czech producer's position on the wine market. A significant part of sources we gained from domestic as well as foreign literature and specialized researchers. As a source of information about wine growers and their products, we can use reports from Ministries of Agriculture (Green Report in Slovakia, Green Report in the Czech Republic).

Within the scope of this paper we used these methods:
– Analysis: it helps us to divide the whole into smaller pieces, where we can go deeper into researched problem and we can find indicators, which influence given thing
– Synthesis: it comprehends facts gained from used analysis and execute recommendations for future better development
– Comparison: it finds out the position of single factors in a certain time period and its possible changes in time and place.

Results will become a basis for processing recommendations to improve Slovak viniculture's position on the domestic and foreign market.

3   Results and discussion

3.1   Viticulture in Czech Republic

Czech Republic is a wine country, which is situated in central Europe. It belongs to wine countries of Old World, which have a long-term tradition in wine

production, not only from the high-quality aspect. These wines are made of grapes, which are grown in the most northern wine fields. In Czech Republic, wine is represented by less than 2 % from all agricultural production. Bohemia and Moravia represent a primary division of winery fields. Moravia is created by four sub-fields: Znojmo, Slovácko, Veľké Popovice, Mikulov. These sub-fields include 312 vinicultural communities. Bohemia consists of 2 wine regions: Mělník and Litoměřice, which include 66 vinicultural communities.

Based on the data Green report published MoA (2017), managed wine area in the year 2016 represented almost 17,7 thousand ha, while actual productive potential was at the level of 18,5 thousand ha. From the wineries age structure point of view, there has been a significant increase of the fraction of new areas to 19 % (3128,60 ha) since 2004. The impact on this fraction has an application of rights to repeat out planting of wineries. Old wineries, which are older than 50 years, cover only 2 % from overall wine area. The change of conditions of winery planting in Czech Republic brought an entry into European Union on 1st May 2004, i.e. new wineries can be replanted only after deracination or acquiring rights to replant winery again.

Czech Republic is engaged in a program for vinicultural support. It is financed by European Union. In years 2014-2018 wine producers have been donated by more than 700 million Czech crowns. This support may be conducive to increase of competitiveness of Czech wines on the international market and change of traditional way of growing wine into bio-growing.

In accordance to Svodobová, Věžník, Král (2014), formal way of growing grapes has changed significantly for 5 years into an integrated system. This enlargement can be seen mostly in Morava, where the fraction of organic vineyards. They have been enlarging for whole period of time very quickly.

Figure 1 shows a development of wine production in Czech Republic in period of 2009 - 2016. In comparison, domestic production increased by 20,4 % in this period, while the study of Ministry of Agriculture says that production dropped by 8,5 % in recent years. This was caused by unfavourable weather. From the whole production of wine, there is two-thirds of white wine and one-third of red wine in Czech Republic. The majority on produced wine is guarded with the background and geographical mark.

Figure 1 **Wine production in the Czech Republic in thousand hl.**

Source: Ministry of Agriculture CR (2017), own calculation.

Consumption of wine is in Czech Republic more and more popular. Modern and healthy lifestyle causes increase in the consumed wine, while it is generally agreed as a beneficial. Consumption of domestic wines has become dominant. In 2008, the consumption was at level of 16,3 litre per capita. The wine was consumed in the past only sporicidal. For instance, after the WWII. the consumption was only 6 litres per capita. Since that time, the Czech Republic has marked a positive trend, which has reached the level of 20 litres per capita. (Czech Statistical Office, 2016). As the Syrovátka, Chládková & Žufan (2014) claim, the reasons for greater consumption could be seen in the change of lifestyle. It was all interconnected with the slump of spirits with a higher percentage of alcohol. On the other hand, the white wines (Veltínske zelené, Müller-Thurgau) and red wines (Frankovka, Svätovavřinecké) have become famous among the domestic population. The elementary assumption for the sustainable growth is continuously increasing quality of wine and using of technologies, which might change applied wine properties. Motivation for improvement of consumption's position may be the significant interest into wineries where the consumers may find extraordinary aspects of wine and viniculture.

Export of domestic wines was almost none after the integrating Czech Republic into European Union, it happened because of new rules for neighbours, e.g. business quota and fees. When we reached the membership of EU, Czech market was enriched with cheap wines from Portugal and Spain. Tomšík and Sedlo (2013) define Czech Republic as a country where the wine is produced and it is dependent on import of grapes. They also state the fact of higher import than export of domestic wines. Within the scope of export of Czech wines in 2016, Czech Republic exported maximum 28 995 hectolitres to Slovakia and to Poland they exported wine in amount of 12 794 hectolitres. Czech Republic imported the majority of wine from Spain.

Figure 2 **Export and import of wines in the Czech Republic 2009 - 2016**

Source: Ministry of Agriculture CR (2017), own calculation.

According by Kučerová (2014) the wine sector of Czech Republic is characterized by the surplus of domestic consumption over the domestic production. As the consequence, there is a ban on enlarging the EU production to cast over blank space between production and consumption with own resources. The development of foreign market proves that the country should not give up of export of Czech wines abroad, while the trend of import and export is continuously growing.

3.2 Situation in Slovakia

In the past, Slovakia was focused more on quantity than quality. Production of low-class wines caused stagnation in interest for Slovak wine and it was shown in development of production as well. Hronský (2002) states that in present times the production of wine is quite spread and popular. Ambitions of domestic wine producers are increasingly greater, while they see demand for wine. In Slovakia we have six wine-producing regions; mainly on the South: Small Carpathian, Nitra, South Slovak, Central Slovak, East Slovakia and Tokay. Wine regions are defined by borders and its own specific properties of soil and wine cultivation.

The development of vinicultural areas has been changing for all time. In accordance to Kádeková, Nagyová and Dobák (2010) main priorities of EU include development of viniculture. As the consequence of this development may have been increased competitiveness of wine producers in EU and balance of demand and supply on the European market. Rebič and Horská (2017) state that when we became part of EU in 2004, there was a change in some processes on wine market. This was meant to be done by deregulation of mercantile barriers and intersection

of other European countries and in this way to be able to be competitive with cheaper wines with lower quality in domestic market. Slovak wine producers took an advantage in using of innovative technologies and respect remedies of EU. They are concentrated on production of quality wines, which are distinguished with typical territorial properties of vinicultural areas.

Table 1 **Development of harvest areas of native vineyards, production and average yield**

Year	Vineyard area (ha)	Production (t)	Average yield (t/ha)
2004	12 003	56 537	4,71
2005	13 130	54 103	4,12
2006	11 781	52 037	4,42
2007	11 507	49 142	4,27
2008	9 650	51 617	5,35
2009	9 340	42 131	4,51
2010	8 152	21 120	2,59
2011	9 930	49 015	4,94
2012	10 492	52 209	4,98
2013	10 039	53 227	5,3
2014	8 757	38 450	4,4
2015	8 803	50 158	5,7
2016	8 712	37 832	4,34

Source: Slovak statistical office SR, (Pol 18-01).

In accordance to Statistical Office of Slovak Republic, the harvesting area, production and average yield per hectare have decreased. In a comparison of years 2004-2016 it is drop for 27,4 % of harvesting area and reduction of production for 33 % tons of grapes. Yet, the decrease of production was influenced not only by amount of harvested hectares, but by the amount of yield as well. Executive director of Wine-dresser association and wine-growers of Slovakia, Pátková (news, 2017) argues about the problem of Slovak viniculture. She defined it as unsorted lands even though, there is still interest for planting in grapes. The second problem, she thinks so, is import of wine, while it is filled in Slovakia and sold as Slovak wine. Average yield during the controlled period of time expressively varied 4,5 t/ha, however, these changes were influenced by the weather during the year. According to Matošková & Gálik (2014), the cut-down of cropping areas during this time period has had an impact on decay of few enterprises, which were focused

on growing wine grape in Slovakia. According to Kádeková, Nagyová and Dobák (2010), Slovakia has almost none profitability without subsidies. The reasons are intensive price policy of cheaper wines from Southern European countries. Costs and prices should have achieved 30 to 40 % of vintage.

Table 2 **Wine consumption in Slovak Republic (l)**

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Wine consumption	69 055	71 977	71 608	69 399	73 129	100 967	80 210	-
Consumption per capita	12,7	13,2	13,3	12,8	13,5	18,6	14,8	13,9

Source: Slovak Statistical office, 2017.

Kučerová (2014) divides the Slovak wine consumers into two main groups. The first group is characterized by price sensibility, who prefer attractive price over the quality of wine. Consumers, who belong to this group, are in lower income class and they would rather buy cheaper table wine from abroad. Based on the data from Slovak wine producer's Union, the domestic consumption is approximately 50 %. The second group is more oriented on quality of vinicultural products. These customers prefer high-grade wines made by first-line wine producers.

Figure 3 **Sources and consumption of wines in Slovakia (th. hl.)**
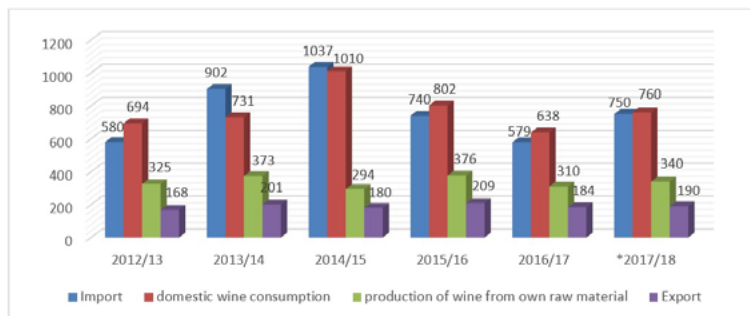
Source: Situational and forward-looking report Grapevine and wine, own calculation, 2017.

*estimation

Slovak consumer of wine has increased the consumption of 1,2 litre for 8 years. The greatest increase was recorded in 2014, it was to the amount of 18,61

litre per capita. The consumption in year 2016 (13,9 litre) is not at the average of European Union. The average consumption has been decreasing and import has been achieving more significant position than stagnated export to countries beyond European Union. General consumption of wine is still higher than domestic production, which is compensated by import to Slovakia. On the other hand, almost half of domestic production is exported to other countries.

4   Conclusion

Based on the results we may evaluate, that vine-growing and wine production in Slovakia and Czech Republic have marginal importance for a national economy. However, for many wine-growing areas, wine production is linked to local history, traditions, and lifestyle and greatly contributes to rural development. In case of Czech Republic, when it became a member of EU the production potential rose to 18,5 thousand per hectare (overall vineyards area 17,7 th. ha) and increase of new vineyards up to 19 % of whole area. Domestic production of wine decreased to 487 thousand hectolitres in year 2012. Another season, production increased up to 650 th. hl and in year 2016/2017 up to 686 th. hl. The whole area of vineyards is represented by 10 800 ha in Slovakia, the harvested proportion is 8 872 ha and not harvested 1928 ha. The harvested area dropped (- 91 ha), the production dropped (- 12 326 t) and also the average yield (- 1,36 t.) Problem of production fluctuation is mainly the weather, which many times makes the situation worse for wine-growers. Wine production is not sufficient for whole domestic consumption, nevertheless, the majority of enterprises has adopted the strategy of increasing quality. That is the reason why these high-quality wines became popular among the domestic consumers as well as ones from abroad. Qualities of both countries in wine producing are shown in regular achieving on the top positions in several international competitions all over the world. Czech Republic has a better out-coming position than Slovakia, whereas the yearly consumption is about 20,1 litres per capita. It is 6,5 % less than Slovakia has. Demand for wine is dependent on the age of consumer, lifestyle, education, geographic position or tradition. General consumption of wine is still higher than domestic production, which is compensated by import to both countries. Nevertheless, factors influencing buying behaviour is a price of product and availability of substitutes or more precisely cheaper alternative of product. Detailed analysis of import and export are necessary for the improvement of decision-making process among the producers in Slovakia and Czech Republic. This is needed for better and easier choice in a fragmented market; both domestic and global. It all should support promotional events, attendance at international vinicultural fairs.

For further improvement and development of vinicultural position we recommend:

- planting of new vineyards and support of new wine-growers support programme,
- easier rules and bindings to strengthen position of agriculture and environmental arrangements to support agrarians,
- increase competitiveness of high-quality domestic wines on international market,
- increase the proportion of domestic wines through merchandise and increase education of wine consumers,
- improvement in bargaining power while buying inputs for production,
- improve comparative advantage in processes: costs, type, quality, design, distributive canals,
- innovation of technological processes and technologies used for wine preparation,
- more expressively support quality of Slovak and Czech wines on the domestic market and present them abroad.

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TECHNICAL SUPPLY OF UKRAINIAN AGRICULTURAL ENTERPRISES AS A COMPETITIVENESS IMPROVEMENT FACTOR

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Abstract

State of technical resources in Ukrainian agriculture is critical nowadays and they directly impact quantity and quality of agricultural production Ukrainian agrarian sector makes, that influences economy as whole, because of huge part of agricultural produce (mostly grain) in Ukrainian export. So increasing competitiveness of agrarian enterprises through improvement of technical supply is absolutely necessary in modern conditions. The purpose of the article is to systematize the factors influencing formation and use of technical resources by Ukrainian agricultural enterprises and to determine effectiveness of state support for agricultural producers in technical re-equipment, as well as to substantiate strategic directions of technical modernization of agriculture in terms of providing innovation and efficiency of technical resources use.

Keywords: *agricultural commodity producers, competitiveness, resource-saving technologies, technical potential, technical upgrading*

JEL Classification: *O32, Q16, Q55*

1   Introduction

Increase in agricultural enterprises competitiveness is directly related to ensuring continuous reproduction of technical capacity and implementation of high-performance technical systems, machinery and equipment, use of modern

technologies for crops cultivation and animal breeding. Without a scientifically substantiated organization of reproduction of technical potential of agricultural enterprises based on identification of specific factors and features that affect the process of reproduction and improvement of technical potential elements, identification of sources to ensure expanded reproduction cannot ensure efficient functioning of business entities in agriculture.

2 Data and methods

Data from official statistics, annual and operational reports of agricultural enterprises were used. The main methods for processing economic information were the method of statistical groupings and correlation-regression analysis with the purpose of comprehensive study of factors that affect the level of technical supplies of agricultural production in Ukraine.

3 Results and Discussion

Technical resources in agricultural production provide an intensive type of development of the industry and promote its competitive development. The FAO approach to technical resources means use of tools and mechanisms in agricultural production that provide the process of mechanization (Clarke, 1997). In its essence, agricultural mechanization involves technological changes through the use of technical resources for agricultural operations. Obviously, prospective development of agriculture is closely connected with implementation of precision farming technology that have economic and environmental benefits, in particular, reduction of water use, fertilizers, herbicides and pesticides, minimizing their negative environmental impact (Banu, 2015) and robotizing technological processes in livestock and crop production (Emmi, 2014).

Therefore, for Ukrainian agricultural production, important issues are analyzing technical support of agricultural production and determining conditions for availability of innovative technology that will ensure competitiveness of the industry and the country. The main problems of deterioration of the material and technical condition of fixed assets in agriculture are: a low investment activity of agricultural producers due to their low level of solvency; insufficient volumes and flaws in targeting of state support for renewal of agricultural fixed assets for small and medium-sized farming in the countryside; low level of agro-leasing development; absence of indexation of book value of fixed assets of agricultural enterprises (Yashan, 2012).

The reasons for deterioration of general state of agricultural enterprises logistical support, especially small and medium businesses, are: low level of reproduction and renewal of basic productive assets of agriculture in comparison with national economy of Ukraine; lack of sufficient state support; disinterest of owners themselves.

Agriculture has practically suspended the processes of reproduction and updating of the material and technical base. Due to annual decrease in the number of machinery and tractor fleet and its book value in agricultural enterprises, the possibility of own traditional sources of updating and replenishing of the machine-technological park is lost.

Because of high level of wear and tear, each year, a quarter of tractors and combines do not go to immediate place of work, and expenses for repairs increase accordingly by 5-7%. The old system of service and maintenance has been destroyed, but the new one has not yet been created. The lack and low quality of technical equipment and a high level of wear and tear increase the annual load on the machine-tractor park. The term of mechanized work increases 2-5 times, the quality of work decreases, and consequently the loss of yield increases (Skotsik, 2014).

We found that the largest correlation index, and hence the largest impact on the receipt and purchase of agricultural machinery, was for investments in fixed assets (Table 1). Direct foreign investments did not affect this process due to their small volumes. The level of profitability of production, labor productivity, and the price index for the sale of agricultural products did not significantly affect the flow of technical resources to agricultural enterprises during this period. This means that the profit of agricultural enterprises on average in Ukraine is low and did not significantly affect the process of machinery updating. With regard to the impact of prices on agricultural machinery, the corresponding correlation index is significant and positive, which is caused by the purchase of a significant amount of expensive foreign machinery for the period under study.

Table 1 **Couple correlation indices between receipt and purchase of agricultural machinery and key macroeconomic indicators for 2010-2015**

Indicator	Machinery received	Machinery purchased				
	Tractors	Grain harvesters	Tractors and harvesters of all types	Tractors	Grain harvesters	Tractors and harvesters of all types
Investments in the main capital	0,939	0,829	0,917	0,761	0,795	0,804
Foreign investments	-0,636	-0,73	-0,665	-0,591	-0,838	-0,682
Level of profitability of production	0,149	-0,091	0,084	0,241	-0,13	0,151
Productivity of labor	0,245	0,098	0,21	0,056	-0,057	0,031
Price indices for tractors and agricultural machines	0,911	0,96	0,932	0,711	0,988	0,817
Indices of prices of agricultural products.	0,045	-0,201	-0,022	0,186	-0,226	0,083

Source: Compiled and calculated according to the data of State Statistics Service of Ukraine.

Each year in agricultural enterprises the number of waste equipment exceeds the number of purchased one more than 10 times. The possibilities of own sources of updating and replenishing of the machine-technological park, such as depreciation fund and profit, are rapidly decreasing. Almost all the funds that need to be invested in machinery and equipment are used mainly for financing of working capital, including purchase of seeds, lubricants, mineral fertilizers, payment of bank interest on a loan, etc.

State support programs for technical support of the agrarian sector of the economy are not sufficiently effective. A small number of state-owned leasing companies while distributing funds for these programs are in unequal conditions with other entities in leasing market. The use of state funds by the latter puts them in a privileged position with regard to private leasing companies using credit funds. This situation hinders the development of a civilized leasing market based on fair competition, primarily in the agrarian sector of the economy.

In agrarian scientists' opinion, the decline in solvency was caused by a sharp decline in the investment activity of agricultural producers, a decrease in the

availability of funds, technical and energy equipment of agricultural production (Mogilova, 2012). As a result, the depreciation of fixed assets exceeds their renovation10-15 times, the level of mechanization of production of all types of agricultural products has decreased. A number of important technological operations provided by the regulations for growing crops are not carried out, which reduces yields and gross output and exacerbates economic crisis in the agricultural sector. The state of the machinery and tractor park of the agrarian sector was close to critical, which threatened the complete loss of machine technology of agricultural production.

Currently, the park of agricultural machinery used in the production process, has about 1 million units of machinery and equipment. According to the target segment of the research, the park numbers more than 500 thousand units. The dynamics of the availability of technical equipment in agricultural enterprises for the period 1991-2015 has a negative tendency. The number of tractors decreased accordingly by 369.4 thousand, and combines by 78.5 thousand units. (Figure 1).

Figure 1 **The number of main types of agricultural machinery in Ukrainian agriculturalenterprises, units**
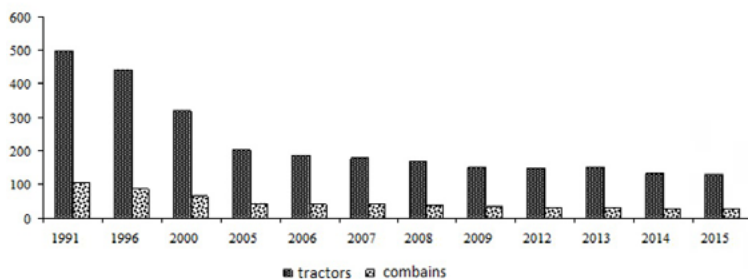
Source: Compiled and calculated according to the data of State Statistics Service of Ukraine.

Quantitative and qualitative reduction of the machine-tractor park has led to an increase in load on equipment. Thus, the number of tractors per 1000 hectares of arable land decreased from 124 units in 2000 to 68 in 2012, grain harvesters per 1000 hectares of grain sown area from 65.2 units to 26.7 (Figure 2).

Figure 2 **The number of tractors and grain harvesters per 1000 hectares of agricultural land, units**
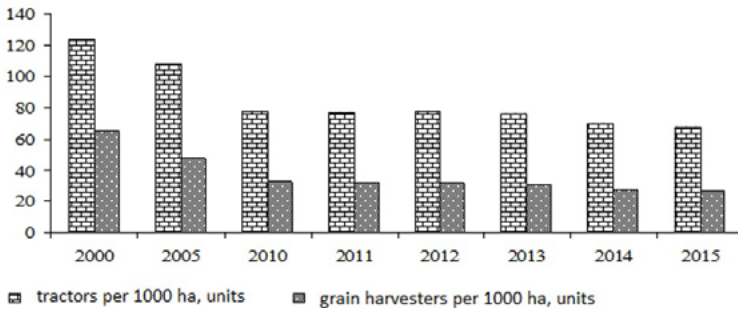
Source: Compiled and calculated according to the data of State Statistics Service of Ukraine.

Seasonal load on grain and forage harvesting machinery and other equipment on farms is more than 2.5-3 times higher than normative. Low technical support leads to an extension of agricultural work terms, deterioration of work quality, a significant increase in crop losses and reduced agricultural crops yields. The energy supply of production and labor power are also reduced, which in Ukraine, respectively, are 3-4 and 4-6 times lower than in the USA and Germany.

So, grain harvesting is 100% provided by combines, but for 20 days or more, instead of 5-7 days. Agro-technical terms of basic soil cultivation, planting and care are violated everywhere due to the lack of technical means. It should be noted that from the total number of grain harvesters operating in fields of Ukraine, the share of domestic combine harvesters Slavutich is 2%, foreign combine harvesters 20%, constructively outdated combine harvesters of Soviet times 78%. Thus, the fleet of tractors is only 45% of agriculture needs, grain harvesters – 48%, forage harvesters 75%, lorries 66%, premachines 85%, harvester – 46%, plows 37%, seeders 66%. In other types of equipment, degree of supply need ranges from 35 to 60%. Annual losses of grain during harvesting are estimated at UAH 8-10 billion.

At the end of 2015, at agricultural enterprises, there were 127.9 thousand tractors in working condition (readiness 95% versus 96% in the corresponding period of the previous year), 310 thousand units of tillage equipment (96% vs. 96%), 65.5 thousand seedlings (95% versus 94%). If in Ukraine there are 68 tractors for a total of 1,000 ha of arable land, then in Poland 93,3, in Germany 87,4, in France 68,7, in Great Britain 84,7 units. There are 26,7 grain harvesters per 1000 hectares of grain crops in Ukraine (Antoshchenkov, 2012).

According to Figure 3 at the time of gaining independence of Ukraine (1990), the level of power supply was high (369 kW per 100 hectares of sown area) as a basic consequence of the post-socialist mode of management with planned system of equipment supplies. Thereafter, a sharp decline in power supply of agrarian enterprises was observed, which lasted until 2011, when the supply of power capacity amounted to 187 kW per 100 hectares of sown area.

Figure 3 **The level of power supply of agricultural enterprises per 100 hectares of sown area**
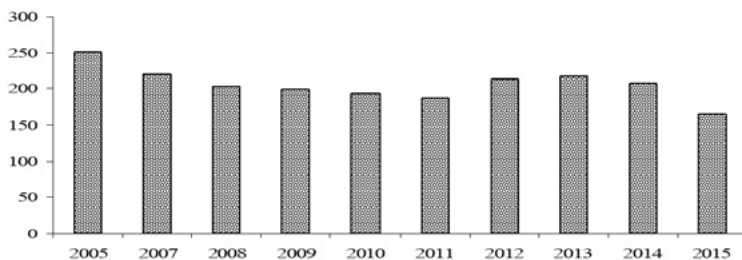
Source: Compiled and calculated according to the data of State Statistics Service of Ukraine.

From the end of 2011 to 2013 there is a slight tendency of growth of power facilities of agrarian enterprises. This process was promoted by the efficiency of agricultural production with an increase in volume of profits from sale of agricultural products by agrarian commodity producers. During 2014-2015, there is a decrease in energy supply of agricultural production due to unstable socio-economic situation in the country, which negatively affected the investment attractiveness of the agricultural sector of the economy.

According to calculations of scientists of NSC "Institute of Agrarian Economics", for stable increase of production of agricultural products, it is necessary to renew the park of agricultural machines, for this it is necessary to put into operation annually: grain harvesters 7,5 thousand; tractors 35 thousand; sowing complexes in the tractor unit more than 2,5 thousand; other agricultural machinery (Kravchuk, 2013). As domestic and foreign experience convinces, the basis of technical equipment of agricultural production remains tractor power at the rate of at least 1.2 hp per 1 hectare, as well as the structure and quality of tractors and trains of machines to them, in order to be able to provide a radical (2-3 times) increase in labor productivity and bringing the terms of work to the agro-technical optimum.

In the level of labor power, agricultural commodity producers in Ukraine are more than 5 times inferior to US farmers. If we compare the labor power of rural and industrial workers, we will see that for the rural ones it is 1.8 times lower. In developed countries this proportion is reverse, that is the farmer is equipped 1,5-2 times better than the industrial worker (Pidlisetskii, 2008).

At present there is an increase in the amount of agricultural machinery, in-cluding of foreign produce, in cash equivalent and its reduction in-kind terms. The structure of the tractor park composition was influenced by the following factors: peculiarities of Ukrainian agriculture according to natural and climatic conditions; a formed composition of categories of farms with different arable land area; use of different kinds of technology for soil cultivation and harvesting, sol-vency of enterprises and some others. In the structure of the tractor park in 2015, the largest percentage (32.5%) falls on tractors with a capacity of 55-80 hp, and 80-135; 29.8% powerful tractors with an engine of more than 135 hp. and only 5,2% falls on low-power tractors, with a capacity of up to 55 hp.

Table 2 **Availability of agricultural machinery in agricultural enterprises according to the organizational forms of economic entities in 2015 (end of the year, units)**

Indicators	Agricultural enterprises total	including:					
		Business partnerships	Private enterprises	Cooperatives	Farms	State-owned enterprises	Other forms
Tractors total	127852	59422	21179	5495	34528	2798	4430
including tractors with capacity:							
under 40 kW	6678	3190	931	367	1458	257	475
from 40 to 60 kW	41489	18501	6685	2237	11236	1249	1581
from 60 to 100 kW	41615	18245	7014	1475	13062	654	1165
over 100 kW	38070	19486	6549	1416	8772	638	1209
Of the total number of tractors:							
wheeled tractors	118178	55187	19508	4837	32437	2515	3694
crawler tractors	9674	4235	1671	658	2091	283	736
Combines and machines:							
grain harvesting	26735	10983	4569	1238	8774	419	752

Indicators	Agricultural enterprises total	including:					
		Business partnerships	Private enterprises	Cooperatives	Farms	State-owned enterprises	Other forms
corn-picking	1634	756	282	148	321	54	73

Source: Compiled and calculated according to the data of State Statistics Service of Ukraine.

Regarding the availability of agricultural machinery at enterprises, it is worth noting that the bulk of the tractors is registered in business partnerships and farms. The least number of tractors is involved in state-owned agricultural enterprises. Almost half of the seed equipment is in use of business partnerships. At the same time, only 2.3% of all seedlings are registered at state-owned enterprises. A similar situation exists in the segment of combine harvesters.

The analysis of the technology park of farms has shown that tractors are dominant in it. Owned by these farms, there is a significant amount of sowing equipment 21% of the total sowing park in Ukraine, and grain harvesters (23.6%), despite their annual withdrawal.

Machine-tractor park of the majority of agricultural enterprises, machine-technological stations and farms is physically and morally obsolete. However, 74% of respondents considered it to be satisfactory (including 74% of agricultural enterprises, 70% of machine-technology stations and 86% of farms), and 86% of all respondents consider the state of the repair base of their enterprises to be satisfactory.

The average indicator of machinery deterioration in domestic agriculture is 70%, in particular for tractors 77.57%, and for combines 70.56%. It has been established that the level of wear of tractors significantly depends on the area of agricultural land in use of the agricultural enterprise. Thus, on farms with an area of up to 200 hectares the degree of wear is 75-80%; 200,1-1000 ha 65-74; 1000,1-2000 hectares 50-64%, 2000,1-5000 hectares 25-50, over 5000 hectares up to 25%. The tractor park is considered to be more worn out if the number of machinery over 20 years old is 50.05% of the total, for combines 44.81% respectively. In this case, the fleet of tractors has a longer period of operation, as evidenced by a smaller share of newer technology in the overall structure.

Nowadays, the extension of equipment life allows us to determine the expediency of further exploitation of the means of production, in order to prevent the decline in production volumes. Heads of many agricultural enterprises are faced

with a choice: to buy one new machine or to repair 4-5 old ones for the same amount of money. Of two machines with the same specifications, it is more likely to be chosen the one the service life of which is less and, consequently, the price is lower.

To renew the machine-tractor park of agricultural enterprises to the level of technological need, it is necessary to buy machines and equipment worth more than 15 billion UAH every year. Of these, on the renewal of the park of tractors it is necessary to spend 3,0-3,5 billion UAH, grain harvesters 3,5-4,0, beet-harvesting machines 0,35-0,4, forage-harvesting 1,0, livestock machinery 1, 0, general purpose equipment 2-3 billion UAH. In addition, in order to maintain the machine-tractor park in working condition, it is necessary to spend 2,0-2,5 billion UAH for purchase of spare parts and repair materials.

The main source of the machine-tractor park formation is profit, which is aimed at its updating (Table 3). However, agricultural enterprises with the highest level of profitability occupy a small part in the structure of acquisition of major types of machinery and equipment, the purchase of agricultural machinery by loss-making and low-profit farms in large numbers is due to their orientation towards an intensive type of production.

Table 3 **Grouping the purchase of agricultural machinery and trucks according to the level of profitability of enterprises of the corporate sector of the agrarian economy in 2015**

Groups on profitability of agricultural products,%	Profitability level,%	Tractors of all types		Seeders		Grain-harvesting combines		Milking installations		Trucks	
		units	% to total	units	% to total	units	% to total	units	% to total	units	% to total
under -10	-23,6	202	7,3	156	6,7	24	4,7	28	7,6	29	7,2
from -10 to 0	-4,3	207	7,5	176	7,6	25	4,9	53	14,4	29	7,2
0,1-10	4,5	390	14,1	407	17,6	51	10,0	131	35,7	49	12,2
10,1-25	17,1	617	22,3	495	21,4	111	21,9	68	18,5	80	19,9
25,1-50	35,6	737	26,6	573	24,8	152	29,9	70	19,1	111	27,5

Groups on profitability of agricultural products,%	Profitability level,%	Tractors of all types		Seeders		Grain-harvesting combines		Milking installations		Trucks	
		units	% to total	units	% to total	units	% to total	units	% to total	units	% to total
50,1-75	60,0	340	12,3	261	11,3	87	17,1	13	3,5	63	15,6
over 75	133,1	280	10,1	247	10,7	58	11,4	4	1,1	42	10,4
Total	20,4	2773	100,0	2315	100,0	508	100,0	367	100,0	403	100,0

Source: Compiled and calculated according to the data of State Statistics Service of Ukraine.

We have found that the average group level of profitability of agricultural production of enterprises of the corporate sector of agrarian economy (Y_1), depending on the average group wear of ICC (x) for the period of 2008-2010, is well approximated by linear regression (Figure 4):

$$Y_1(x) = a_0 + a_1 * x, \qquad (1)$$

where $a_0 = 65,964$; $a_1 = -0,678$. Couple correlation index $K_{xy} = -0,98$.

Figure 4 **Dependence of the average group level of profitability of agricultural production on the average group depreciation of ICP enterprises of the corporate sector of the agrarian sector of Ukraine for the 2010-2015 period.**
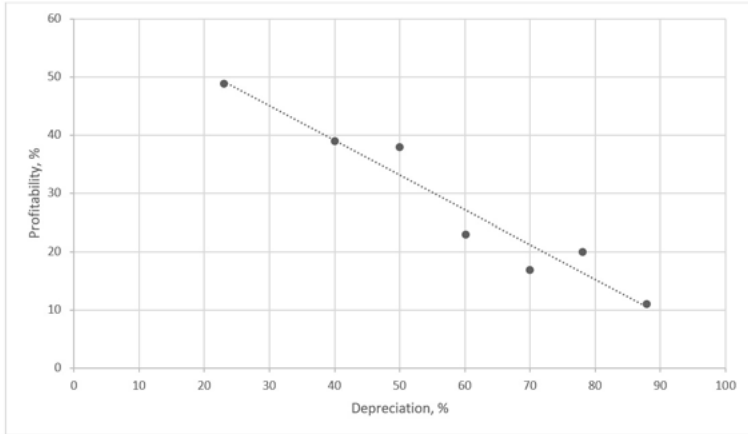
Agricultural service cooperatives (ASCs), which are focused on providing services for joint cultivation of soil, mainly to their members, whose number has almost doubled during 2008-2015, play an important role in the conditions of insufficient technical support of agricultural producers. However, most of them perform the functions of business entities for provision of services for land cultivation, due to inconsistency of legislation regarding them as non-profit organizations. In addition, most ASCs hold technical equipment only for execution of a limited list of technological operations for crop production (plowing, cultivation) and provision of transport services.

4   Conclusion

It has been established that the reduction in agricultural machinery quantity, and the reduction of machinery amount in kind in terms of unit per area of cultivation, as well as in assessing power availability, indicates a decrease in technical capacity and the need to implement resource-saving technology. On the one hand, high load of equipment increases physical deterioration and, on the other hand, accelerates return on capital investments required for purchase of fixed assets and reduces the risk of using moral depreciation of technical means, which actualizes measures to optimize loading of existing high-performance, modern machinery

and rational use of depreciation as a source of funding for reproduction of resources.

The age structure of the technology park, formed in the agriculture of Ukraine, does not allow to assert that technical resources are used within amortization period, which, first of all, reduces collateral base of enterprises, reduces the efficiency of resource use due to growth of expenses for repairs and maintenance, increase in timing of technological operations. The development of agricultural technical potential should be aimed at improving markets for agricultural machinery, repair and technical services, including market for used machinery; improvement of agricultural machinery leasing; concentration and centralized use of technology based on creation of a network of machine and technology stations.

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KNOWLEDGE AND INFORMATION IN THE PROCESSES OF MANAGING THE ORGANIZATION CASE STUDY

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Abstract

The article concerns a case study of the use and application of knowledge and information in the company. In the first place, the assessment of knowledge and information management processes was carried out, and the main goal of the research was to identify the benefits of effective management of these resources in the company. A method of standardized interview was used to obtain data, which was carried out with 40 employees of the company. Based on the interviews, it can be concluded that the communication processes, as well as knowledge and information management are perceived by the respondents. They are also aware of the possible benefits of proper knowledge and information management. There are some barriers and disruptions in the knowledge management processes in the analyzed company. In order to reduce them, several options for solving these problems and improving management processes were indicated.

Keywords: *knowledge, information, management, processes*

JEL Classification: *D88, D83, M12*

1 Introduction

Information and knowledge resources located in the company are not static, are constantly growing and are subject to modification (Figurska, 2014; Borowiecki & Kwieciński, 2003). They require continuous verification and processing, as well as coordination and cooperation with the rest of the resources on which this knowledge and information have an impact (Burkiewicz & Zaborowska, 2011). Large enterprises have their own databases and data warehouses, where data and information are stored and processed. In companies focused on innovation, knowledge is created on the basis of conducted research and experiments (Cierna et al. 2017, Kiełbasa 2016b). Definitely, it requires devices that are able to store and process data, as well as qualified employees who have knowledge in the field of information management and the use of specialized software. Company conducting scientific research are equipped with laboratories in which experts and scientists are hired (Fazlagić & Jan, 2014). One of the definitions of knowledge and information management is that it is a conscious behaviour of people aimed at optimizing the role of knowledge and information in achieving goals by an organization (Kowalczyk & Nogalski, 2007).

Nowadays, running a company requires knowledge of information management processes, as well as knowledge that is the result of skilful use of information (Galant & Perechuda, 2005). It should be remembered that knowledge is created by various methods. It is often difficult to codify, as in the case of tacit knowledge, or has many meanings - and therefore it can be interpreted depending on the individuals point of view (Morawiecki, 2006; Drangert et al. 2017). Knowledge and information are quickly obsolete (with the information becoming obsolete faster), hence the need for constant supplementing in any organization. Knowledge can materialize, and thus externalize in products and services, and codification processes make knowledge structure in technologies, teams (organizational learning), as well as individuals in the organization (tacit knowledge, mentoring, coaching) (Niedzielska & Perechuda, 2004, Świgoń, 2012).

At each stage of the organization management, knowledge and information processes can be distinguished. The implementation of each management function requires knowledge of the collection, storage, processing and sharing of knowledge and information (Figure 1).

Figure 1 **Relations between management functions and information and knowledge processes**
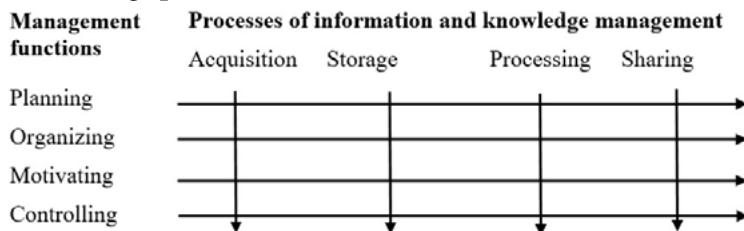
Source: Griffin, 2017; Roman, 2012.

Knowledge is an essential component of operational, tactical and strategic management, thanks to which the level of uncertainty in decision-making processes can be reduced (Różański, 2013). The operational dimension is defined as a process with the task of creating formal knowledge that can be articulated and stored (eg. in the form of documents), and tacit knowledge that is impossible or very difficult to codify (eg. employees experience, attitude, character traits, skills, etc.). The operational level requires the knowledge necessary for everyday operations that will quickly become obsolete (Griffin, 2017; Gierszewska, 2011). The second is the tactical dimension, which is based on the use of knowledge and information to achieve the medium-term goals of the organization, enabling adaptation to the competitive environment (Griffin, 2017; Borowiecki & Romanowska, 2001). In turn, the strategic dimension refers to long-term goals, such as the creation of a knowledge-based organization and a learning organization, in which the implementation of economic goals does not exclude the development of organizational culture. The strategic level is the knowledge necessary for long-term management, allowing adaptation to changes in macro-environment (Roman, 2012; Griffin, 2017).

Knowledge and information management is a continuous process, in which several "subprocesses" can be distinguished, ie.: seeking and acquiring knowledge, collecting and storing, processing and enriching knowledge, then disseminating knowledge and sharing (Kłak, 2010). The process of collecting and using knowledge and information is also of significant importance in company management. These processes occur in every organization, but not all of them are clearly distinguished. In large enterprises and corporations detailed phases of knowledge and information management can be divided, such as: 1) Acquisition of information and knowledge, 2) Selection, 3) Storing and collecting, 4) Processing and adaptation for the needs of the company, 5) Codification, 6) Transfer, 7) Developing and

creating new knowledge, 8) Sharing knowledge, 9) Updating knowledge (Probst, Raub & Romhardt, 2002, Kokavcová, 2009).

Undoubtedly, knowledge and information are key factors for innovation and competitiveness of companies today (Prus P., Drzazdzynska K., 2017). Companies are constantly looking for innovative solutions and ways to improve the quality of offered services and products. Thanks to the knowledge and information management skills, not only improve the processes of human resources management in the enterprise can be improved, but above all, the potential in employees can be used in a better way (Morawiecki, 2012). It allows to reduce the costs of managing the organization, and also contributes to building and shaping the image of the company, including its products and services on the market (Nonaka, 2007).

Knowledge and information management brings many benefits to the organization that can be distinguished at the intra-organizational level and the benefits of the environment (Figure 2).

Figure 2 **Benefits of knowledge management and information for the organization**
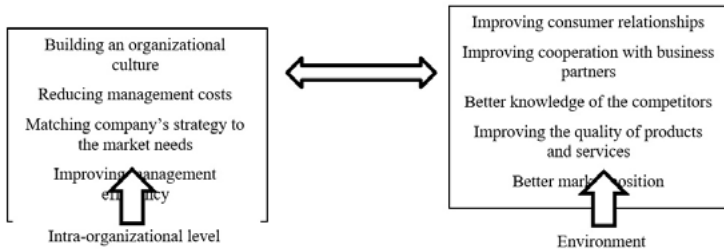
Source: Błaszczuk et al., 2003.

At the inter-organizational level, many benefits can be indicate, among others: the possibility of developing a strategy that takes into account the results of research and opinion of experts, which will be tailored to the clients' needs. Taking into account the importance of knowledge and its exchange contribute to improving the relationship between employees, supporting employee development and improving the motivation system. This can lead to the stimulation of innovation and creativity of employees and managers, and in a further stage to the creation of a basis for building a learning organization and organizational culture (Cierna et al. 2017). The benefits of effective knowledge and information management are also better organization of information flow. What's more, faster acquisition of information saves time and costs of process management in the company

(Davenport & Prusak, 1998). The ability to manage knowledge and information improves the flexibility of business management, which results in a faster response to market changes (Griffin, 2017). Knowledge management processes influences not only the organization, but also the environment, such as improving customer relationships (Figre 2). This, in turn, translates into better matching of the offer to the needs of customers and improvement of the quality of products. It is also important to improve relations with market partners and other market participants (Wawrzyniak, 2003).

This are certainly not all the benefits of managing knowledge and information processes in an organization. Taking into account external benefits, it can be noticed that the perception of the importance of knowledge management processes has a wider dimension. According to Kiełbasa (2016a) and Kalinowski (2011), knowledge lies at the heart of sustainable management, not only in the organizational dimension, but also broader, covering the social context (rural areas, urban areas). Regardless of the location and range of business, sustainable management embraces not only economic benefits, but also social needs, as well as the natural environment. It is necessary for this purpose to acquire knowledge and information in the field of sustainable management and sustainable development processes (Wielewska et al. 2017).

The aim of the paper was to identify and assess the functioning of knowledge management processes and information in a selected company, as well as to analyze the benefits of effective management of these resources. The problem presented in the article has a form of a case study. It is a research method that allows identification and analysis of the causes of a given phenomenon (problem), and also allows to observe its results. The aim of the case study was to analyze the problem based on the opinions of employees, managers and owners of the company, and to develop proposals for solutions to the encountered problems.

2   Data and Methods

In order to collect empirical data an interview was conducted in 2017 with a standardized questionnaire. The research was carried out among employees of a company producing dump trucks, containers, cold stores and other equipment for trucks and vans, manufactured for domestic and foreign markets. 40 employees of the company from various organizational levels took part in the interview.

The analyzed company was founded in 1984 and currently employs 86 people. The company consists of several organizational units involved in the production, trade, marketing, maintenance, accounting and quality control department. The managers are directly responsible for individual departments. The production

manager is responsible for the construction department, which deals with the creation of the projects. On its basis, products are made in the production department. In the supply department, purchases necessary for the operation are made, as well as orders. Production workers are divided into brigades that deal with the performance of individual operations, ranging from details - to the assembly of ready-made equipment on a specific chassis. The sales department deals in acquiring and servicing customers, accepting orders and issuing finished products to recipients. The quality control department is an independent cell whose task is to control components made by employees and to evaluate finished products. The maintenance department ensures the proper operation of machinery, equipment and tools. The marketing department deals with market research, builds the company's image and advertisement.

The organizational structure of the researched company has a linear and hierarchical form. The owner makes the key decisions based on information provided by the managers of individual departments. This type of organizational structure enables making quick decisions and facilitates the coordination of activities between job positions in particular departments. The linear structure works in companies that produce similar products, according to established procedures and operating diagrams. A threat may be the lack of taking the knowledge of specialists into account in the decision-making process, as well as the distortion of the information provided. This kind of structure works well in the processes taking place in the organization, enables the company to operate efficiently and effectively, allows for quick response as well as flexibility against market changes. It promotes the dissemination of knowledge and information. Moreover, it allows for quick response and ease in acquiring the necessary information to perform employee duties.

3   Results and Discussion

40 employees of the discussed company took part in the interview. These employees occupied various positions, ranging from executive employees on the production line and foremen, to managerial positions. For the purposes of the analysis, respondents were divided into 3 groups: 1) Employees and line managers (foremen); 2) Employees and middle management (heads of the departments); 3) Directors and owners of the company. In the first group there were 23 people, in the second group 12, while the third group consisted of 5 people.

First, the knowledge and information management processes were evaluated, and then the identified benefits resulting from the proper management of knowledge and information in the examined company were analyzed.

The first stage in the knowledge and information management process is acquisition. This is important from the company point of view and its operation on the market in achieving a competitive advantage. The speed of acquiring reliable information determines the achievement of a good market position. In the surveyed company, many sources of knowledge and information can be indicated. According to the interviewees and company owners (40%), information obtained from clients is the most important in the process of setting operational, tactical and strategic goals. Relevant in the opinion of the respondents may also be information from the competition (15%), obtained by observation and analysis of market messages sent by competitors. In the opinion of the respondents, significant knowledge is also found in company databases (13%), and on the Internet (15%). Some of the respondents (17%) also pointed to the need to seek and obtain knowledge about innovations (new technologies, new solutions).

An important aspect in the process of knowledge and information management is its collection and proper storage. There are many ways to store it. In the opinion of the employees, the best way to gather knowledge and information is computer networks (48%), followed by paper documentation (15%) and databases (10%). The respondents also indicated the importance of tacit knowledge (27%), because according to them considerable knowledge resources is accumulated in the minds of people, in their experience and cognitive processes.

Next important stage in knowledge and information management is processing and developing. It is undoubtedly one of the most difficult processes, often requires large financial outlays, as well as understanding the methods of effectively transforming information into knowledge, and the externalization of tacit knowledge. It often requires a change in mentality and approach to learning processes (Drangert et al 2017). The willingness to acquire knowledge by employees is an important factor in the development of the organization and without this building learning organization is difficult (Nagyová et al., 2016). In the surveyed company, 29 respondents (72.5%) declared motivation to develop knowledge through learning and transferring their knowledge to other team members. However, 11 respondents (27.5%) did not show any interest in further development. These employees stated that they do not have the opportunity to develop knowledge for financial reasons (training courses). As far as the information and knowledge processing is concerned - the company uses computer programs (mainly accounting) and systems that create databases (including customer databases). These tools allow the processing of data and information for the needs of senior and middle management as well as line managers (i.e. foremen). The transfer of knowledge by experienced employees may lead to the transformation of a tacit into explicit knowledge. This contributes to increasing the efficiency of

teams'work and, consequently, to improving the quality of products and services offered. Over a half (55%) of the surveyed employees and managers of the company received help from more experienced employees in the past, who shared their knowledge with less experienced young team members. The remaining (18 respondents) gave a negative answer, indicating lack of time and motivation to share their knowledge.

In turn, in the processes of transmitting and sharing information according to the respondents, e-mail (30%) and direct conversations and meetings with company colleagues (30%) are most often used. The next position is the internal network - Intranet (25%), then the database (15%). The speed of the transfer of information is important in this process, because it can quickly outdate and after some time requires re-analysis and verification.

According to the employees and line managers, the most important is knowledge and information in the processes of organizing work (Table 1). In the second place the processes of planning were placed. According to this group, the most important is the knowledge that allows to streamline operational processes in the company. For the employees and mid-level managers, the most important is knowledge in the processes of organizing the teams work, and knowledge supporting the processes of controlling the results of work. According to this group, knowledge that improves tactical and operational management is the most important. According to the information obtained from the directors and the owner of the company - they are primarily looking for information and knowledge for planning. Their task is to prepare long-term plans, and so the strategic management knowledge is important at this level (Table 1).

Table 1 **The importance of knowledge and information in the implementation of management functions, in the opinion of respondents [N = 40], the assessment made by respondents on the scale from 0 to 1**

Specification	Employees and line managers	Employees and middle management	Directors and owners
	n = 23	n = 12	n = 5
Planning	0,20	0,30	0,10
Organizing	0,10	0,10	0,40
Motivating	0,40	0,40	0,20
Controlling	0,30	0,20	0,30

Source: Own research.

Communication plays an important role in the implementation of all management functions as well as information and knowledge management. Effective communication has a big impact on work efficiency and its result. Over a half (55%) of the interviewees positively assessed the communication processes in the organization. However, almost 1/3 (30%) were of the opinion that there are barriers and disruptions in the communication process. According to them, the result of these barriers is that not all relevant information arrives on time and in the right form. The remaining respondents (15%) were negative about the assessment of communication processes in the company, indicating frequent disruptions and lack of feedback.

Recognizing the importance of knowledge and information undoubtedly brings many benefits to the organization. These can be measurable benefits (eg. reduction of production costs, acquisition of new customers), but also unmeasurable (eg. better atmosphere at work, greater trust of employees to the management, better communication with clients, etc.), occurring at every level of the company. These benefits may include the level of operational management, tactical level as well as long-term management (Griffin, 2017). The benefits of knowledge and information management can be analyzed at the organizational level, as well as in the environment. The latter concern, among others is improving relationships with other market participants (customers, competitors, business partners), as well as striving to achieve the desired position in the market.

Taking into account the surveyed company and respondents' answers, several groups of benefits resulting from knowledge management can be identified. These benefits can be divided into internal and external (surroundings) (Table 2).

Table 2 **Identification of the benefits of knowledge and information management in the company in the respondents' opinion [N = 40], the assessment made by respondents on the scale from 0 to 1**

Specification	Employees and line managers	Employees and middle management	Directors and owners
Intra-organizational benefits	**n = 23**	**n = 12**	**n = 5**
Tailoring strategies, visions and missions to market needs	0,80	0,70	0,10
Increased team work efficiency	0,10	0,30	0,40
Saving time	0,20	0,20	0,60
Improving management processes	0,60	0,10	0,30
Reducing management costs	0,70	0,40	0,20

Specification	Employees and line managers	Employees and middle management	Directors and owners
Better cooperation in a teams	0,30	0,80	0,70
Increased employee competence	0,50	0,60	0,60
Improving employee motivation	0,40	0,50	0,50
Benefits for the external business environment	n = 23	n = 12	n = 5
Adaptation to the customers' needs	0,20	0,20	0,10
Improving the quality of products and services	0,10	0,10	0,20
A better position relative to the competition	0,40	0,30	0,30
Feedback from the environment	0,30	0,40	0,50
Building a positive image	0,50	0,50	0,40

Source: Own research.

The data presented in Table 2 shows that for employees and line managers the greatest benefits of managing knowledge and information in a company is to increase the efficiency of work in teams, thanks to exchanging and sharing information and knowledge. As a result, it is possible to deliver better quality products to the market. In turn, for the group defined as "employees and middle management", the biggest benefit was time saving (mainly the implementation of production processes and team management), as well as better adjustment to market needs and customer satisfaction. However, when analyzing the responses of the company's directors and owners, it can be noticed that knowledge and information are useful primarily in strategic planning processes, including shaping the company's vision and mission. This also leads to a better adaptation to the needs of customers on the market (Table 2).

4   Conclusions

Proper management of knowledge and information in the company leads to many positive changes. Knowledge and information management can affect both business image, the perception of a company as a learning or innovative one, as well as processes occurring within the organization.

Taking into account the perception of the benefits of effective knowledge and information management, it can be noticed that for the employees and line managers in the company, the most important was to improve the work of teams and save time. For medium-level employees and managers it was important to improve management processes. And for the owners of the company the greatest benefit was a better matched strategy, mission and vision statements. Despite the differences in the assessment of intra-organizational benefits, all the respondents perceived the same benefits for the external business environment. It was an adjustment to the market and improvement of the quality of products and services offered. Therefore, it can be concluded that despite different perceptions of benefits, the result of efficient knowledge and information management is the improvement of product quality and adaptation to market needs.

However, there are many barriers to the implementation and management of these processes, which were also noticed in the company under the study. Mainly it was the reluctance of the employees to adapt to new rules, or to share their knowledge, inappropriate style of management or discouragement due to the lack of visible (tangible) and immediate results of knowledge management. The following conclusions can be made on the basis of the tests:

- The greatest importance in the process of knowledge management according to employees was information obtained from customers. This type of knowledge should be taken into account in the first place and constantly updated,
- Knowledge and information were stored in the company in databases, however, according to the respondents, tacit knowledge is more important, and therefore the experience and knowledge of employees was the most valuable asset,
- Half of the respondents wanted to share their knowledge and help other colleagues, just as they were assisted and mentored by older employees,
- Almost half of the respondents assessed the communication processes in the company well.
- Based on the analysis of problems diagnosed by the respondents, some recommendations were made to improve the knowledge and information management processes in the surveyed company:
- It is advisable to develop and implement an internal training system for employees and management,
- It is recommended to apply a knowledge development system, along with a system of motivating employees to take these activities,
- It is advisable to improve "up" and "down" communication processes. Development of the "up" and "down" communication system will allow both the

acquisition of knowledge from employees, as well as the formulation of understandable messages essential for the proper performance of duties by employees of different levels in the company,

- It is recommended to improve communication processes using the "feedback" system. Introduction of such a system will oblige employees to provide feedback at all levels of the company.

Acknowledgements

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THE SELECTED ISSUES OF AGRICULTURAL EXTENSION SERVICE IN SLOVAK REPUBLIC

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Abstract

The primary objective of submitted article is to evaluate the current tendencies in agricultural advisory services, to analyze its education, knowledge and innovation pillars. In frame of the research was conducted a questionnaire survey in primary agricultural business entities, as well as in the companies providing services to agricultural business entities. The questionnaire survey was carried out in 161 companies. The content of the survey was focused on the basic data about the services provided to agricultural business entities, on knowledge and innovation penetration, to the main barriers for introduction of new technologies, as well as to the issues linked to the education of farm/company's owners or managers. The end of the article is devoted to issues connected to the enhancement of the education of farm managers, status of the agricultural advisory services in Slovak Republic, as well as to the innovation matters.

Keywords: *agricultural extension, agricultural innovation system, agricultural knowledge system, knowledge and technology transfer in agriculture*

JEL Classification: *Q13, Q16*

1   Introduction

Management Consultancy belongs in frame of the world, as well as in the EU among the most intensively developing sector. The above mentioned is partly

linked also to the agricultural advisory services, especially in the EU-15. The assumed expectations in relation to to this enterpreneurial activity have been met only partly after the EU accession in some states. From the V-4 states the agricultural advisory services are dynamically developing, first of all in Hungary and in Poland. In the Czech Republic this activity starts to be successful, however in Slovak Republic its results are still lagging behind of the most developed EU states. With intention to discover the real status of advisory services, as well as their impact on the implementation of innovation and new knowledge into the agricultural primary production entities, we carried out the questionnairy survey into which have been involved 161 farms/agricultural companies.

Anderson and Feder (2004) define agricultural advisory services as the scientific subject oriented on the information transfer, demonstration of innovations and the education of new economic methods, as well as on the provision of professional advices to agricultural entities. Analogical definition was formulated by Berglunda and Dworak (2010). According of these authors, the agricultural extension is understood as verbal, written advices provided by advisors in agricultural entities with provision of direction how to resolve the practical problems.

The new trend in management of advisory services is knowledge brokering. Billington and Davidson (2010) claim, that during the last decade the firms underwent in the whole world through numerous innovations, thank to the rapidly developing technologies, which are offering more rapid and better solutions on various strategic, operational and organisational problems. Roos and O´Connor (2015) state that technological innovations are driving force in permanently changing economic world. Technological innovation is often creating temporary monopolies, which can bring significant profits, which are in certain period taken by competitors and imitators. These temporary monopolies enable to innovative firm to develop new products and processes. Trigo, Ekong and Chowdhury (2015) describe agricultural innovation as the dynamic interaction between more actors, which are participating on the cultivation, processing, distribution, consumption, or by the other way utilised agricultural products, together with researchers, providers of agricultural extension service.

As it is claimed by De Pinto and Ulimwengu (2016), among the CSA mechanism /intelligent agriculture with regard of the changing climate is the stronger capacity and the extended number of agents/advisors at the provision of agricultural advices.

According Buček, Rehák and Hudec (2010), the new knowledge is the result of the knowledge process in frame of research activities, as well as stemming from practical experience. In the sense of system theory approach, we can understand the complex of knowledge as a system and in the case of individual knowledge

we can speak about the system's units. Logically, then knowledge as a system is the result of the research activity in the science, and more complex systems as the society, economy are giving the names to knowledge, as the knowledge society, knowledge economy, or knowledge management.

The key topics which are driving the business in this sector of entrepreneurship, are first of all innovations, which can in meaningful way support the growth of sustainable agroecological production in meeting the requirement of consistently increasing number of people in the world, that agribusinessmen will be able to produce sufficient amount of food.

In this respect, the agricultural extension, education, research and innovation with knowledge society are becoming the key pillars for feeding the world population in 2050 which according of prognoses will reach the number 9, 2 bill. people.

2   Data and Methodology

The objective of submitted article is the evaluation of the recent status of agricultural advisory service, as well as to undertake analysis in relation to the knowledge and information pillars.

Primary data have been obtained from the questionnaire survey. This was delivered to the agricultural primary production's entities and to the agencies dealing with agricultural extension. The questionnaire survey was completed by 161 top managers from farms/agricultural companies. The survey was carried out in the period from October to December 2017. The questionnaire was distributed by electronic way to the selected group of respondents. The data received from survey had been processed by the table calculator and by Microsoft office 2010, as well as by statistical software SPSS 25.0. In addition to this, we set up the two hypotheses which are closely connected to the objective of this article.

3   Results

3.1   The Description of the Selected Group of Farms/ Agricultural Companies

According of the time when companies were establishment, 63, 4 % of them have been created less than 10 years ago, resp. 11-20 years ago. From 161 farms/agricultural companies, 40 of them were founded 21- 30 years ago, and more as 30 years ago have been created 19 entities. This is documenting that into the research

have been included farms/companies, which have been created to the end of the transition process, respectively after its accomplishment, prior to EU accession.

At the survey participated first of all farmers (47,2 %), then managers of limited liability companies (29,8 %), followed by agricultural cooperatives with 16,8 %. The lowest rate in the survey was achieved by the shareholding companies (1,9 %), as well as the trade companies (3,1%).

With regard of the size according of the employees 'number, into the questionnaire survey have been involved mainly farms/agricultural companies with number of employees up to 10. This refers to the 118 entities (73, 3 %), while on the second place are situated small companies with number of employees from 11 to 49. In our survey this is about 35 companies (21, 7 %). Among the middle companies have been involved only 6 surveyed subjects (3, 7 %) and the requirements of large company had been met only by two business entities with more as 250 employees. The results of these characteristics document, that current status according of employees' number, in the overall structure are prevailing small and micro-enterprises, which usually do prefer seasonal employees.

The fact that into the survey have been involved mainly smaller agricultural entities is documented by data referring to acreage of the cultivated land. Less as 500 hectares are cultivated by 68, 3 % enterprises (110). 28 (17, 4 %) of them are operating on the size between 501-1000 hectares. The first and second groups together do represent 89, 6 %. Only 9 business entities are operating on the size from 1001 to 1500 (4, 3 %), and finally 9 entities are doing their business on the size higher as 2000 hectares (5, 6 %).

3.2   The Employees 'Education

The qualified working forces, which are increasing their qualification and extend their knowledge sources, skills and capabilities, are represent significant source of enterprise' success. The employees knowledge are perceived as the assets of the companies at the achieving the reasonable profit. The level of human capital is possible to improve through the formal education, or through various educational forms and professional preparation. The education is the important investment into the human capital.

The key employees are the competitive advantage for each firm, but especially these advantages are represented by employees, who are very important for their knowledge and skills and their eventual separation from company could cause to the business entity the serious problems. The result of our survey confirms that only 23, 6 % farms/agricultural companies are organising regular educational programmes, and 54, 0 % entities deal with this important activity only sporadically. In total, this represents 77, 6 % firms. On the other side even 50 % (80 answers

with "*definitely yes*") farms/companies consider employees education as the very important. "*Preferably yes*" in favour of education expressed 17, 5 % entities.

With regard, of preferred educational form, the answers of respondents are portrayed in figure 1. The most popular form is participation at the excursions, followed by open days focused on agricultural technologies, and then exhibitions. In total 78 % farms/companies are favouring the last mentioned form. Individul education is organised in 68 % of cases and the participation on the educational programes outside of the company is representing 62 %. Dual education so far is not listed among the preferable educational forms in the 73 % of cases.

Figure 1 **Preferred Education Form in the Farm/Company**
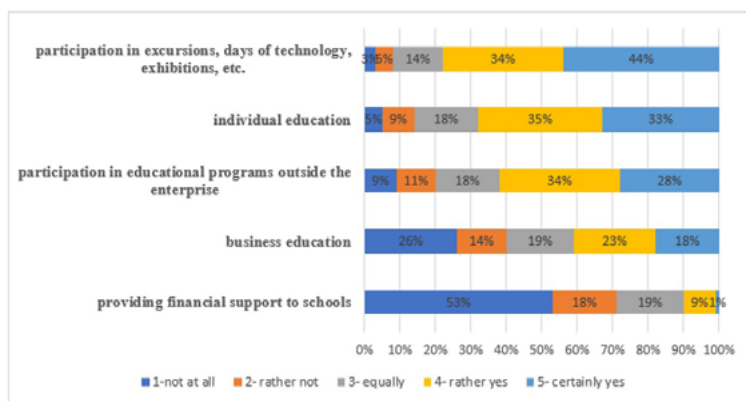
Source: Own research.

3.3 The Utilisation of Agricultural Extension

Only in 43 % cases the managers benefited from professional advisory services in 2017, and 58 % business entities did not utilise this activity. Commercialisation – payment for consultations is clearly dominating form, not only in the private extension services, but also those in state sector. The business entities with lower level as 1000 Euro of payments for advisory services represent 68, 1 %. Companies with the finances volume in range from 1001 up to 5000 Euro, represent 26, 1 %. Those with higher payments from 5001 to 10 000 Euro and beyond of 15 000 Euro achieve the equal share 2, 9 % of each.

The largest interest was about the advisory services in the crop production, horticulture, orchards and viniculture, where 23, 04 % enterprises have benefited from this kind of extension services. The sector of animal production and

veterinarian services do represent 17, 43 %, and extension service in agricultural machinery is on the same level with 17, 97 %. In the field of economics, accounting and management are required the services of advisors in 14, 75 % of cases. The advisory services in the area of cross compliance is at the level of 13, 36 %. The significant is also the field of organic farming and environment, where the advisory services had been provided to 5, 53 % enterprises. In addition to this, 3, 69 % of farms/companies were looking for advices in the fields of rural development and alternative energies. The lower interest about the advisory services appeared in the irrigation, just 0, 92 % companies benefited in this area.

The most preferable form of the extension service was the face-to-face meeting in the company with average of 4, 08 % and inclination of 0,970. The proffered forms are also the trainings in small groups with average 3, 97% with standard inclination 0,975. The least favourable form of extension service is the training in larger groups, then through the publications, broadcasting or TV.

The most frequent initiator on the utilisation of extension service is the management of the farms/agricultural companies, even in 66, 7 % of cases. The reasonable role is played also by the extenssionests, who initiated the implementation of extension service activities in business entities in 24, 6 % cases. Combination of both initiatives appeared in 7, 2 % situations.

3.4   Innovations in Agriculture

The enterprises most frequently are drawing information about the innovations from the professional journals and newspapers. This is representing 18, 2 % of responses (table 1). This is followed by electronic mass-communication means as TV, broadcasting and internet (in the case of 17, 5 % of farms/companies). 16, 7 % business entities mentioned that exhibitions are good source of information. They also indicated seminars and conferences as important sources for innovations. Presentations and demonstrations have been supported by 13, 5 % respondents. In addition to this, the suppliers and traders provide information about innovations in 12, 0 % of cases. From this angle of view, the daily news represent only 6,2 % of information which provide information about innovations.

Table 1 **The Information Sources about Innovations in the Farms/Agricultural Companies**

		Responses		Percent of Cases
		N	Percent	
Sources	daily press	38	6,20%	24,20%
	professional press	112	18,20%	71,30%
	television, radio, internet	108	17,50%	68,80%
	seminars and conferences	98	15,90%	62,40%
	exhibitions	103	16,70%	65,60%
	presentations and practical demonstrations	83	13,50%	52,90%
	suppliers of inputs	74	12,00%	47,10%
Total		616	100,00%	392,40%

Source: Own research.

The largest group of business entities 53, 9 %, in the case of evaluation of their own capability to introduce new knowledge, responded that their capacity is "*more than satisfactory*". The responses in the category – "*stronger*", have been indicated by 20, 8 % enterprises. In contrary 11, 7 % respondents evaluated their capacity to utilise new knowledge as "*partly satisfactory*" and 7, 8 % of them consider it as "*non-satisfactory*". However, the 5, 8 % of enterprises evaluated their capacity in this field as "*very strong*".

The biggest barriers at the improvement of innovation systems according of the farms/agricultural companies are in first line linked to the costs to which they have to face in the case of insufficient financial resources; the great challenge is linked to the long investment return in the case of innovations; legislation; regulations; and then taxation. Secondly, it is about absence of qualified people on the side of producers, insufficient production capacity of the science and research, lacking collaboration, weak protection of the ownerships rights, the resistance against the changes, difficulties with control of innovation's costs, non-satisfactory structure, missing clients' interest about new products and processes.

In third line, it is about missing market information on the producers'side, absence of information about technological opportunities, lack of information about technologies on the side of producers and high risks connected to the innovations.

3.5   The Tests of the Hypotheses

In frame of this research, we set two following hypotheses.

Hypothesis 1:Large and middle-size enterprises invest into the agricultural advisory services more financial resources than small- sized companies.

The objective of the first hypothesis was to find relationships between the size of enterprise on the one side, and on the second side on the invested financial resources to the agricultural extension. Both variables are stemming from the questionnaire survey. We selected them from the written responses in connection to the size of company and the amount of financial resources invested into the agricultural extension.

The null hypothesis: The size of company has no relation to the financial resources which have been spent on the agricultural extension service in 2017.

The alternative hypothesis: The size of enterprise has relation to the amount of financial resources spent by the farm/agricultural company on agricultural extension service in 2017.

Testing statistics χ2 is equal to 24, 808, respective p-value is equal to 0,000. Also the other tests (correction by function, or probability rate) confirm the result of χ2 test, whereas their p-value is also 0,000. Upon the basis of these results we reject the null hypothesis and we do accept the alternative one. Upon of this we conclude that hypothesis 1 is confirmed, what virtually means that the larger farms/agricultural companies spend on the agriculture extension more financial resources as the smaller ones.

Hypothesis 2: the larger amount of financial resources spent by farms/agricultural companies on the agricultural extension is coming up from integrated advisory services which provide the inputs to agribusiness companies.

In the questionnaire survey, the respondents have been requested to indicate, that how much they spend on the advisory services provided by the individual inputs 'suppliers. Respondents had to express the value from 0 to 100 %. In frame of second hypothesis we compare the given values for both variables. Whereas, the both values have been provided by same respondents, for comparison purposes we used non-parametric test.

Null hypothesis: The volume of extension services implemented in the agribusiness companies in the form of integrated advisory services provided by the inputs suppliers is equal to the volume as it is provided by the professional advisors.

Alternative hypothesis: The volume of extension services implemented in the agri-business companies in the form of integrated advisory services provided by the inputs suppliers is higher than the volume provided by the individual professional advisors.

Respondents mentioned that in average, the share of advisory services provided by the inputs suppliers achieves the level of 42,50 %, while the extension services provided by the professional advisors reach the level of 57,50 %. Hence, the difference is visa-versa as have been assumed in hypothesis. With the aid of

Wilcoxon's one selection test, we verified whether this result is statistically significant.

From the calculated data stems that 18 respondents mentioned higher volume of services provided by the inputs suppliers, 27 of them indicated that higher volume is provided by the services carried out by professional advisors. Furthermore, 19 respondents evaluated that they receive services from both groups on the same level 50 percent of each. However, this difference was not confirmed as significant. P-value of the test is 0,056, what is slightly below the level of significance. Hence, we have to accept the null hypothesis. ***Hypothesis 2 was not confirmed.***

4   Discussion and conclusion

The agricultural extension services are the key issue between commercial and non-commercial subjects, which is providing important information flows, with its aid to farmers can improve their own welfare and to support the rural development. In addition to this ordinary function, they do provide new progressive knowledge on the improvement of productivity in agriculture. Furthermore, it is expected that agricultural extension services will fulfill various new functions, as e.g. represent the support of small farmers, the support to the sustainable ecological production technologies, and successful management of other issues, which are influencing the agricultural practice and the life on countryside.

The results of survey are corresponding with conclusions of Kapsdorferova (2014) in the field of education meaning at the perfection of the information and knowledge in agriculture, despite that our results contain the annoying fact linked to the farmers, when 5, 61% of them have no interest about further education and another weakness is in the high number of enterprises (35), which are not supporting the continuing education of their key employees. The institutialisation of agricultural extension service is not yet perfectly complete, this has negative impact on better harmonization on cooperation between individual actors and also on the possible higher performance of agricultural and food production. Our results are analogical with authors Agbama (2000) and Kadlečíková et al. (2014).

In the field of the largest barriers for improvement of innovation systems, it was confirmed the research carried out by Fáziková and Mariš (2010), that even after 10 years development, the most significant barriers for innovations are the high costs on the own innovations, absence of financial resources, lack of qualified working forces, risks linked to the sale of the new products and administration connected to the procurement of licenses and insufficient protection of the owners rights. Sabadka (2009) writes about six basic units of the innovation

system, which have the impact on the innovation penetration via the support of financing procurement of technologies, as it was mentioned in the results of our survey, referring to the largest innovation barriers and between farm/agricultural company, due to lack of financial resources.

The main message of this article is that agricultural extension service is recognised by the larger agricultural companies, who have sufficient resources for buying the agricultural services. Both professional agricultural advisors and inputs suppliers provide almost identical share of agricultural services. In the field of innovation numerous barriers are existing and great political and institutional support have to be provided in this respect, otherwise the production, economic and social performance of agriculture will be behind of the most developed EU states.

Acknowledgment

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ECONOMIC BASIS FOR THE CREATION OF FODDER BASE OF THE ENTERPRISE

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Abstract

Improving the efficiency of production, increase in gross and commodity production is inextricably linked with the comprehensive intensification, that is, with the growth of additional investments in agricultural production. The increase in capital investments is the basis of strengthening and improving the material-technical base, introduction of achievements of scientific-technical progress. Increasing of intensity of agronomy and animal husbandry promotes more efficient use of land and livestock, growth of crop yields and livestock productivity.

Economic and energy analysis in scientific research in agricultural direction is important because it allows you to justify the options of growing crops from the point of view of profitability and conservation, which is of particular importance in a market economy. Achievements in almost all branches of modern science were noted in the last century. However, the important issues of increasing economic and energy efficiency of agricultural production still remain relevant and a priority for many scientists.

However, a number of problems in this area have not found their solution, since an unreasonable increase in production costs, including due to overuse of agricultural resources leads to a decrease in the efficiency of management. Therefore, scientific research and cameral processing of experimental data should be directed to identification of resources, taking into account the economic and energy feasibility of measures of optimizing the production processes of cultivation of perennial legume grasses in conditions of forest-steppe of Ukraine.

The aim of this study is to evaluate the effectiveness of the cultivation of the studied crops – alfalfa, clover and sainfoin. For this purpose there was selected the method on the basis of calculations of marginal income (for fodder production it is

negative), the total costs, thresholds of production and profitability, on the basis of which the indicators of production costs were obtained.

From the conducted calculations it becomes clear that technologies without the use of fertilizers can be recommended to the farm as the most economical and efficient. The found economic conclusions do not contradict the basic tenets of cultivation of legumes, which indicate that perennial leguminous grasses play a major role in solving the problems of biological fertility of the soil.

Keywords: *cost-effectiveness, production of perennial legumes, production efficiency*

JEL Classification: *Q10, Q13, Q17*

1   Motivation and Research Questions

The main feed required for ruminants is supplied by forage production processes. Its assessment is in many cases possible, for example, by the relative purchase price.

In practice, most often, the main forage is produced for own use. Even where sale and purchase are possible, they exist in very small quantities. If within the economic planning it is necessary to decide how the total demand for main feed can be covered in the cheapest way (in terms of working time, of capital availability), a crucial role is played by the cost of feed production. Therefore, the evaluation of products supplied is in excess.

The animal feed balance sheets is based on nutrient content. This means that these are not the needs in hay and soilage that are balanced but and energy, protein and other nutrients. It is often enough to stay on limited nutrients.

Negative indicators as for the profitability, which are obtained in forage production show, which total costs in using the feeds are additionally transferred on every hectare of cultivation of the latter (in addition to the General costs in animal husbandry) [1].

The analysis of researches dedicated to this problem in the works Durst L., Vitman M., Zinchenko A. I., Petrychenko V. F., and others allows to conclude that approaches to definition of economic efficiency of creation of highly productive agrophytocenosis of perennial legumes need to be systemic.

The aim of the study is to evaluate the effectiveness of the cultivation of the studied crops – alfalfa, clover and sainfoin. For this purpose there was selected the method on the basis of calculations of marginal income (for fodder production it is negative), the total costs, thresholds of production and profitability, on the basis of which the indicators of production costs were obtained.

2   Data and Methods

Marginal revenue is calculated as the difference between the value of commodity output and variable costs in a certain production process. This is a contribution made by a separate product to covering of fixed costs and to the profit of the enterprise. Thus, it is internally economic indicator of competitiveness. Marginal income is always calculated on a certain unit, for example 1 ha and, as a rule, for one year. From the value of marginal income there will be deducted the same fixed values and overhead costs, which are distributed at the end of the year on the entire area proportionally [2,3].

Here it should be noted that feeds are not a commodity, that is, for them there are no permanent markets. In this regard, the evaluation parameters of the feed may be:

- nutrient content (e.g., MWA, fodder units, starch units per 1 ha);
- feed quality (concentration of nutrients, digestibility);
- seasonality of feed arrivals.

3   Results and Discussion

Harvest of forage crops is estimated at market prices only in certain cases, if food produced for sale (e.g., hay). Therefore, such products can be considered as a commodity.

In determining the output of nutrients the following should be considered:

- the annual gross harvest of green fodder (that means, not yet harvested yield without losses), centner of wet weight;
- dry substance content in green mass at harvest (for example, the collected corn; fresh-cut grass, etc.);
- dry substance content in the finished feed (green forage, silage, haylage, hay);
- the calculation of losses needs to distinguish between loss of dry substance and losses of nutrient energy.

The nutrient losses of energy are generally higher than losses of dry substance; however, both greatly depend on the processes of collection and conservation; nutrient content in finished feed (MJ NEL, MJ OE, crude protein) [4,5].

Margin revenues to grow alfalfa, sainfoin and clover for green fodder was calculated for the separate subdivision of National University of life and environmental Sciences of Ukraine "Agronomic experiment station". This method of calculation allows to define the most competitive technology of cultivation for each

crop and to compare these among themselves for the efficiency of their cultivation and yield of energy per hectare.

The study shows the calculation of marginal revenue for alfalfa for green forage by four technologies: without fertilizer, with the application of $P_{90}K_{120}$, application of $N_{90}P_{90}K_{120}$, application of fertilizer UAN-32.

The results obtained in terms of a comparison of variable costs for 1 hectare allow us to determine the most cost effective method in relation to costs.

According to Figure 1, we can conclude that as for the attractiveness of use of one hectare and cost savings of optimal alfalfa for green forage, the most appropriate from the proposed is the technology of cultivation without application of fertilizers – 2771 UAH per 1 ha, while the most expensive in terms of cost of funds was the technology with applying $N_{90}P_{90}K_{120}$ – 4661 UAH per 1 ha.

Figure 1 **Variable costs per 1 ha per year for growing alfalfa for green forage by different technologies, UAH.**
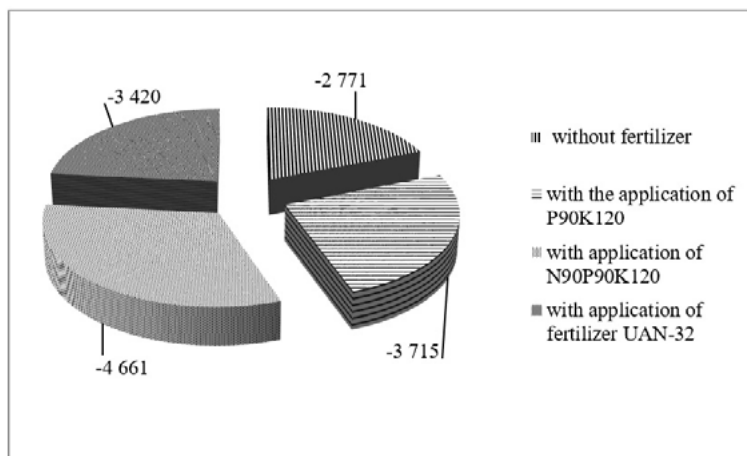
As another indicator of the determination of costs we should note the number of variable expenses calculated for 100 MJ NEL (Figure 2).

Figure 2 **Indicators of variables cost per 100 MJ NEL in the cultivation of alfalfa for green fodder by different technologies, UAH.**
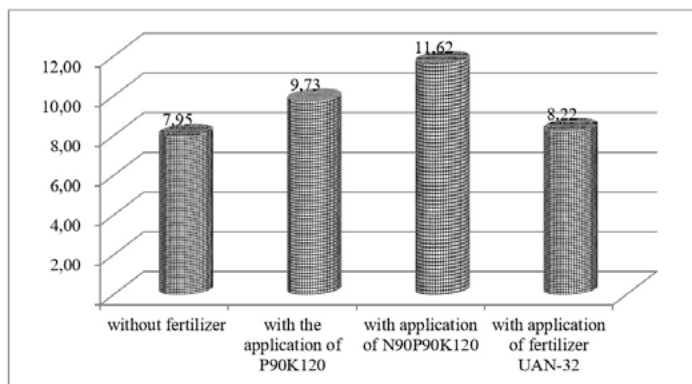
As in the previous calculation, the most economical in its expenditure side was the production of alfalfa for green fodder without the use of fertilizers – 7,95 UAH. To receive 100 MJ NEL most funds are required by the technology that uses N90P90K120 – 11,62 UAH 100 MJ NEL.

Also during the research overall costs (total cost value) per 1 hectare of this crop were calculated (Figure 3).

As defined, alfalfa for green forage here is the product for internal needs of feed production, therefore it is not directed for sale and at the expense of its cultivation the profits is not formed.

Figure 3 **Total costs per 1 ha in the cultivation of alfalfa for green fodder by different technologies, UAH.**
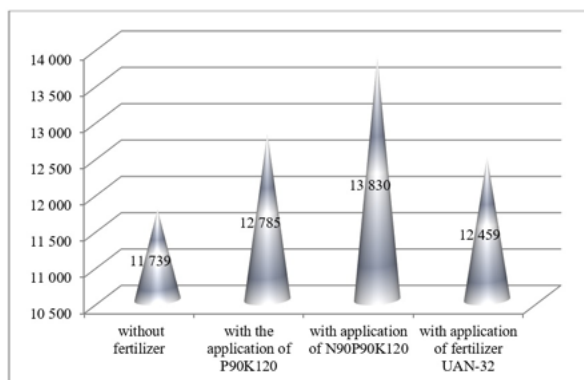
The analysis of Figure 3 shows that the farm, which is studied, requires 11739 UAH of costs for a year for cultivation of alfalfa for green fodder with the technology without application of fertilizers and 13380 UAH per technology, where $N_{90}P_{90}K_{120}$ is applied.

The next crop, which is grown on the farm and which was calculated, is the sainfoin for forage.

According to the analysis of the carried out calculations it can be concluded that the most cost-effective option, as well as among the technologies used for fodder production of alfalfa, was the cultivation of sainfoin for green forage without the use of fertilizers (Figure 4).

Figure 4 **Variable costs per 1 ha per year for growing sainfoin for forage by different technologies, UAH.**
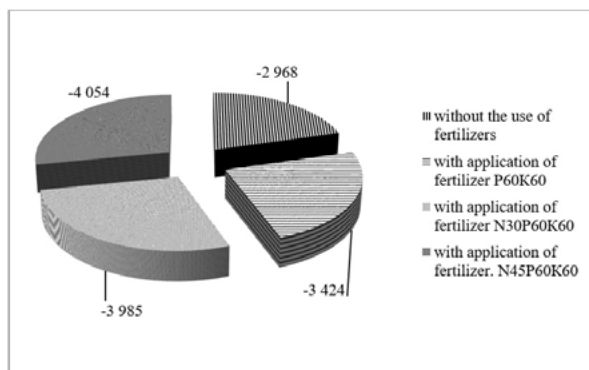
Also this trend has continued in subsequent calculations regarding the variable costs per 100 MJ NEL. The technology without the use of fertilizers for the cultivation of sainfoin requires 15,00 UAH of variable costs, whereas in the case of the use of fertilizers $N_{45}P_{60}K_{60}$ the figure of variable cost per year reaches the highest values – 19,89 UAH (Figure 5).

Figure 5 **Indicators of variables cost per 100 MJ per NEL when growing sain-foin for forage by different technologies, UAH.**
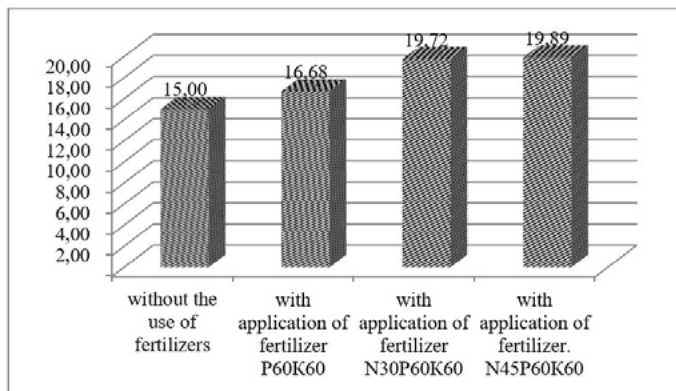
According to the calculations of the total costs per 1 ha, the farm spends 11948 UAH a year when growing sainfoin for forage by the technology without the use of fertilizers, while applying the most expensive technology with the application of $N_{45}P_{60}K_{60}$ – 13151 UAH (Figure 6).

Figure 6 **Total costs per 1 ha when growing sainfoin for forage by different technologies, UAH.**
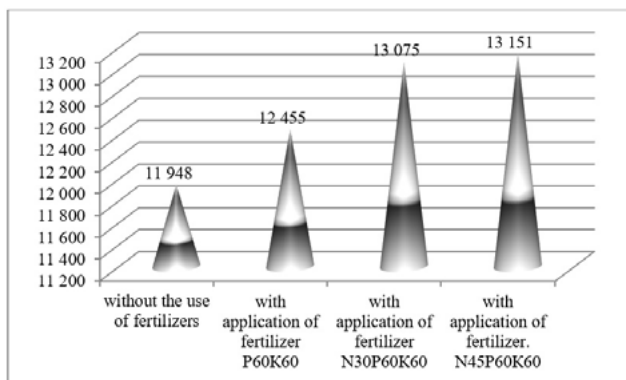
In addition, the studied farm carries out production of clover for green forage using four technologies: without fertilizers; with application of growth regulator; with application of growth regulator and fertilizer $P_{60}K_{60}$; with application of growth regulator and fertilizer $N_{60}P_{60}K_{90}$.

As in the previous cases, the economically justified as for the costs was the technology without fertilization, where variable costs per 1 ha per year is 2570 UAH. The most expensive was the technology with the application of growth regulator and fertilizer $N_{60}P_{60}K_{90}$, with variable costs at the level of 3699 UAH (Figure 7).

Figure 7 **Variable costs per 1 ha per year when growing clover for green fodder by different technologies, UAH.**
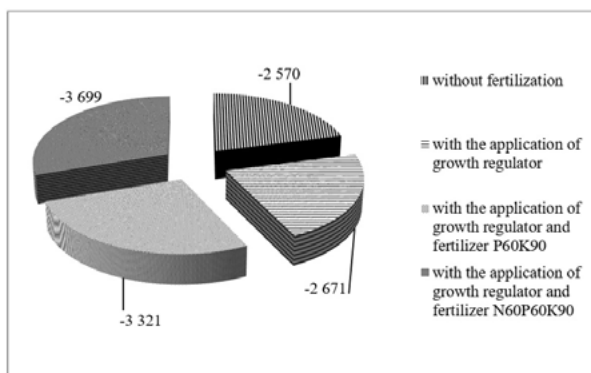
According to the Figure 8, 11,71 UAH of variable costs per 1 ha per year is required based on an output of 100 MJ NEL at the technology without fertilization, while with application of growth regulator and fertilizer $N_{60}P_{60}K_{90}$ – 13,58 UAH.

Figure 8 **Indicators of variables cost per 100 MJ per NEL when growing clover for green fodder by different technologies, UAH.**
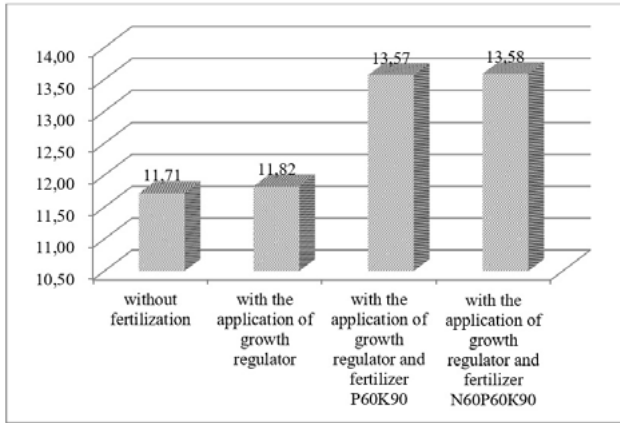
To have a clear understanding about costs, we will calculate the total costs for the production of clover for green fodder.

Figure 9 **Total costs per 1 ha when growing clover for green fodder by different technologies, UAH.**
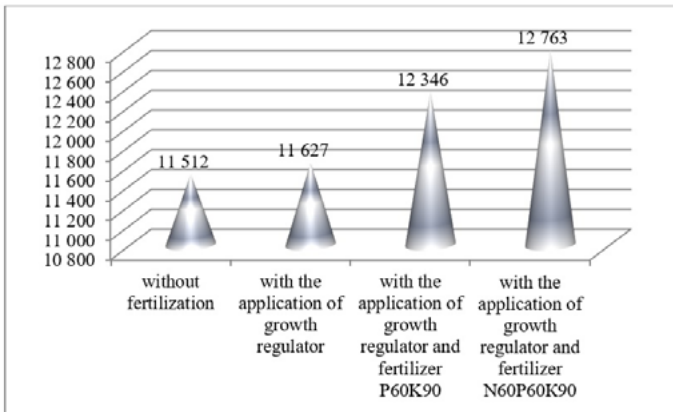
The analysis of Figure 9 shows that the total costs per 1 ha a year for growing clover for green fodder amount to UAH 11512 applying the technology without fertilization, with the application of growth regulator and fertilizer $N_{60}P_{60}K_{90}$ – 12763 UAH.

Also there were calculated the thresholds of production, profitability and production cost for the above three crops: alfalfa, sainfoin and clover for green fodder.

As noted above, in fodder production the commercial products does not exist, so the indicators of economic efficiency possess different economic sense than in commercial crop production.

Determination of price limits in fodder does not matter (except for the sale cases). Thresholds of production and profitability are calculated only for the purpose of selecting the least expensive food. They allow you to evaluate different processes of mechanization on the basis of cost per unit of energy produced. The profitability threshold represents the total cost per unit produced (UAH/MJ) (= average production costs per unit of output).

In Figure 10 presents the cost of production of each of the types of feed at the farm with four different technologies for each of them.

Figure 10 **The production cost of 1 centner of forage for green fodder by different technologies, UAH.**
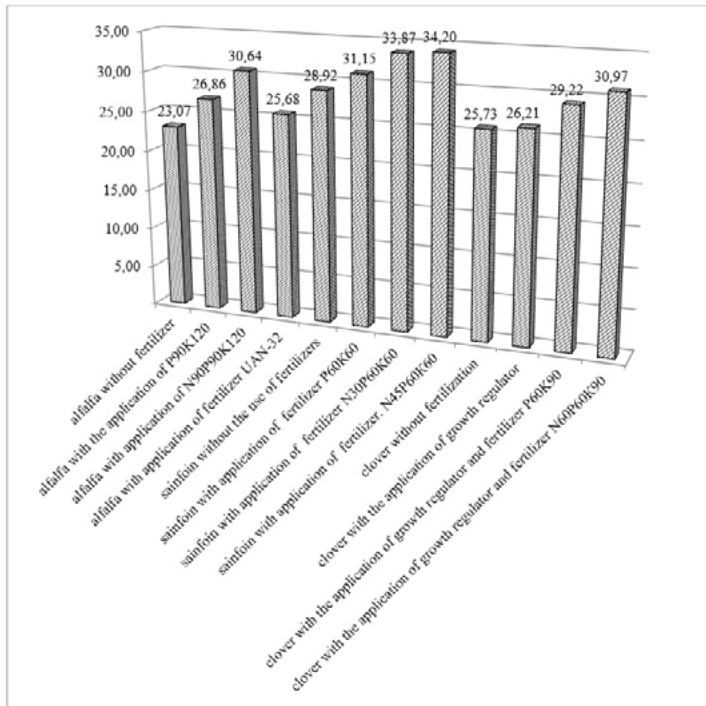
According to the obtained results it can be concluded that for the studied farm most economically advantageous is the production of alfalfa and green fodder, the cost of which is 23,07 UAH/centner. In addition it should be noted that technology without the use of fertilizers is also the most cost-effective in the production of sainfoin and clover for green forage with a cost of 25,68 and of 25,73 UAH/centner, respectively.

4   Conclusion

Hence, from the made calculations it becomes clear that technology without the use of fertilizers can be recommended to the farm as the most economical and efficient. The found economic conclusions do not contradict the basic tenets of cultivation of legumes, which indicate that leguminous grasses plays a major role in solving the problems of promoting biological fertility of the soil. Thanks to the nodule bacteria fixing molecular nitrogen from the air, legumes practically do not require nitrogen fertilizers. The accumulated biological nitrogen enters the soil with the roots and the stubble residues [6,7].

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THE EFFECT OF NON-NORMAL DISTRIBUTIONS ON THE CONTROL LIMITS OF X-BAR CHART

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Abstract

Shewhart control charts are often used by industry organizations for quality control. The most common diagram used is the X-bar chart, which monitors the progress of the mean of parameter over time. For the use of control charts, practitioners a priori assume that the data has a normal distribution. The normality of data can be verified by various tests, but in practice, such verification is often circumvented. If the data does not have a normal distribution, it will of course also affect the values of the control limits. This article aims to investigate the effect of selected types of distributions on the resulting control limits in X-bar charts. The most common types of continuous distributions are analyzed and random data is used. The results point to the robustness of the control limits for some types of distributions and also to varying impact on varying sub-group ranges and varying sample sizes.

Keywords: *X-bar control charts, Contol Limits, Normality, Non-normality, Distributions.*

JEL Classification: *L15, C15, C18, C46*

1   Introduction

Control charts are currently the frequently used tools for statistical process control in industrial organizations (Human, Chakraborti & Smit, 2010). They were

first introduced by Walter A. Shewhart in the 20s of the last century (Hrnčiar, 2014). Since then, they have been enforced and perfected many times. At present, control charts can be considered as the basic tool of statistical process control – ie process control in such way, that the outcome of the process is within the tolerance limits (Chen & Yeh, 2010). Control charts were standardized to ISO 8258 in 1991 and are currently indispensable tools for quality management – finally control charts are one of the seven basic quality tools (Djekic, Tomasevic, Zivkovic & Radovanovic, 2013).

1.1 Types of control charts

Control charts can be of several types depending on the type of variable that is monitored and the situation of the process itself. For continuous data, control charts I-mR, Xbar-R and Xbar-S can be used. If the amount of data is low and one measuring attempt is considered as one case or one time period, it is recommended to use the Individual moving range chart (I-mR). If more than one measurement attempt is used (maximum of 8), it is recommended to use the Xbar-R chart. If it is more, the most appropriate is the Xbar-S chart (Chowdhury, Mukherjee & Chakraborti, 2013).

In the case of discrete variables, the most frequent observed variable is occurrence of non-conforming products. If there is a fixed opportunity for an error, it is recommended to use the np-chart. If the opportunity is variable, the p-chart is more appropriate. The subject of monitoring can also be the number of non-conformities on the product – in this case, the c-chart is used in fixed opportunity and the u-chart is used in variable opportunity (Skinner, Montgomery & Runger, 2004).

Each control diagram has three levels in basic graphical expression. The first level is CL, the central line - it is the average value of the parameter or range. The Upper Control Limit (UCL) represents the upper natural boundary, and the Lower Control Limit (LCL) represents the lower natural boundary of the process. Below are the formulas to calculate these three levels in Xbar chart.

$$CL = \overline{X} = \frac{+}{N}\sum_{i=1}^{N}\overline{X}_i \qquad (1)$$

$$LCL = X - A_2\overline{R} \qquad (2)$$

$$UCL = X + A_2\overline{R} \qquad (3)$$

where   X is parameter, N is number of subgroups, A_2 is constant and R is range between subgroup.

Ideally, individual or average measured values move within these boundaries from LCL to UCL. Figure 1 is an example of the most commonly used control chart – Xbar and R chart.

Figure 1 **Xbar and R control charts**
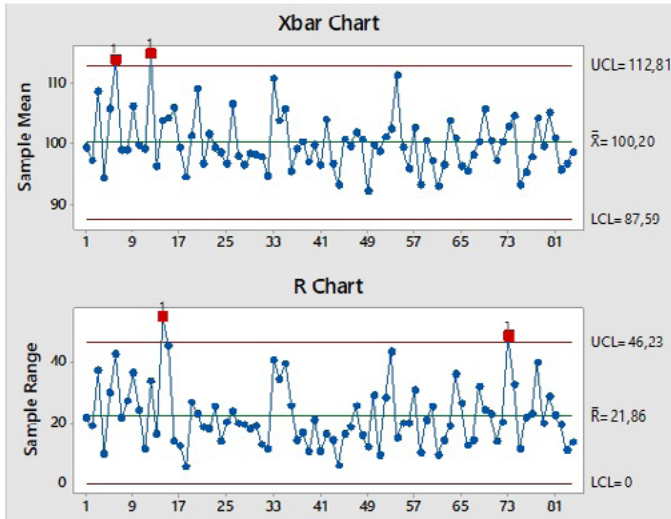
1.2 Basic preconditions of control chart application

In order to create control charts, it is recommended to first determine the parameter to be monitored. Subsequently, individual measurements of this parameter are perfomed at certain time intervals (He, Grigoryan & Sigh, 2002). These intervals may vary depending on the nature of the process. Generally speaking, however, within a single interval, a certain number of measurement are made – eg, 5 products from production line are measured at 7:00, then another 5 products at 8:00, etc. The amount of these measurements within a single interval is called a subgroup. The subgroup size may vary from 2 to 25, but the most common subgroup size is from 4 to 6.

For the use of control chart, it is also assumed that the data has a normal distribution (Schoonhoven & Does, 2010). It is a distribution that is characteristic of the Gaussian curve and is one of the most frequent occurrences.

1.3 Normality in control charts

Normality of continuous data can be verified by a statistical tests. Depending on the sample size, it is possible to use the Ryan-Joiner test (up to 25 values) Kolmogorov-Smirnov (from 25 to 75 values) or Anderson-Darling test (more than 100 values) (Ghasemi & Zahediasl, 2012). In practice, however, it often happens that the normality test is not performed and control limits are calculated on the basis of an incorrect assumption (Lin & Chou, 2007). This can lead to incorrect values of control limits and to misinterpretation of process monitoring results. This article aims to examine the impact of three non-normal distributions on the values of control limits in the most frequently used control chart - Xbar chart. Beta-type distributions ($\alpha = 2$; $\beta = 5$), Uniform (a = 82,5; b = 117,5) and Weibull ($\lambda = 1.5$; k = 3) were examined. In addition to the effect of distribution types, the sample size and subgroups size was also tested. This objective reflects the open questions that were previously indicated by earlier studies (Quesenberry, 1992; Klein, 2000; Nedumaran & Pignatiello, 2001).

2 Data and methods

Random data was used to empirically verify the research aim. Because we also wanted to examine subgroups size of 2, 3, 4, 5, 6 and 7, the resulting number of cases had to be divisible by all of these numbers. The common denominator was 420 – this amount of data fields was generated for all three distributions examined (Beta, Uniform, Weibull) and for the reference (Normal) distribution.

By transforming the data across all distributions, the average of the parameter is approximately 100 and the standard deviation is approximately 10. Basic characteristics of position, variability and shape are found in Table 1.

Table 1 **Main characteristics of distributions**

Distribution	N	Mean	SE Mean	StDev	Min	Q1	Median	Q3	Max
Normal	420	100,36	0,492	10,08	67,11	93,80	100,28	108,15	125,91
Uniform	420	100,59	0,491	10,06	82,59	91,90	100,56	108,92	117,45
Beta	420	100,26	0,499	10,22	82,62	91,69	99,27	108,04	135,02
Weibull	420	100,20	0,489	10,03	86,19	92,92	97,77	105,69	140,81

Source: Own elaboration.

Histograms of random data are in Figure 2. In normality tests, it was explicitly proven that the three studied distributions are non-normal. Thus, the risk of data

transformation in order to obtain the same average and standard deviation values could be that the data would begin to have a normal distribution. However, this risk was not confirmed by the test.

Figure 2 **Histograms of studied distributions**
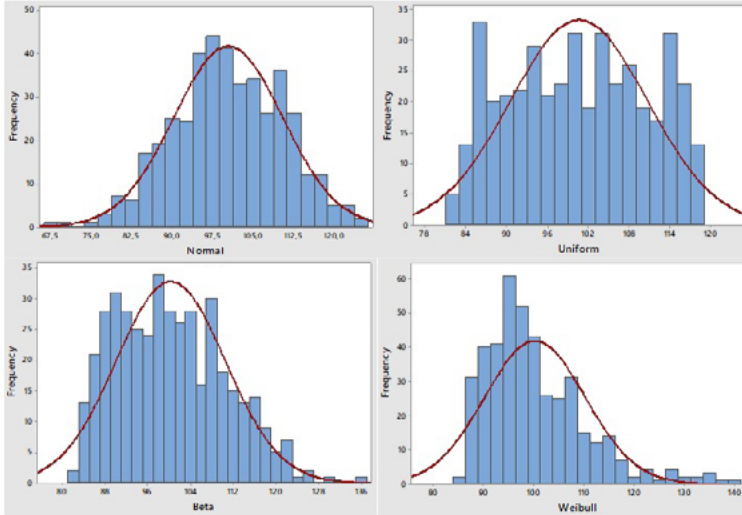
At the same time, it was examined whether the average (approximately 100) and the standard deviation (approximately 10) could be considered the same in all types of distribution. One-way ANOVA was used to confirm that the mean and standard deviations did not differ – Figure 3.

Figure 3 **Testing of mean and standard deviation difference**
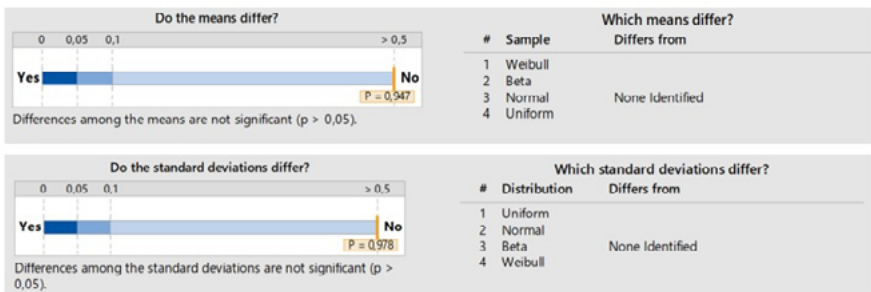
The basic assumptions for correct data analysis were therefore met. The following procedure was used to verify the effect of each type of distribution on control limits calculation:

1. First, the data (sample size = 420) was subdivided into subgroups of size 2
2. Subsequently, UCL and LCL were calculated
3. UCL and LCL values have been recorded
4. Subsequently, one subset was removed (sample size = 420-2 = 418)
5. Steps 2 through 4 have been repeated
6. After sample size = 0, the sample size again increased to 420 and the data was subdivided into subgroups of size 3 and the procedure was repeated

These steps were progressively performed for all three distributions and also for normal distribution. Individual datasets were encoded for easier interpetation. The coding consisted of three parts: (1) type of distribution (2) sample size and (3) type of control limit. For example, the "Weibull_4_UCL" signifies that this is data from Weibull's distribution with subgroup size of 4 and the data represents the calculated value of the Upper Control Limit.

3 Results

3.1 The effect of subgroup size

When the sample size remains constant (in our case 420), only one value for Upper and Lower Control Limit is calculated for each data file. However, it depends on which subgroup size will be used. Table 2 lists the control limits of each type of distribution with a changing subgroup size.

Table 2 **Upper and Lower Control Limits in different types of distributions and subgroup sizes**

Distribution/Subgroup size	2	3	4	5	6	7
Normal (LCL)	78,88	82,38	85,44	86,5	87,83	88,69
Uniform (LCL)	79,21	83,89	86,81	87,29	88,44	89,44
Beta (LCL)	78,24	82,76	85,14	86,55	87,85	88,68
Weibull (LCL)	79,99	83,28	85,40	86,89	88,09	88,72
Normal (UCL)	121,84	118,35	115,28	114,22	112,89	112,03
Uniform (UCL)	121,97	117,29	115,37	113,89	112,74	111,74
Beta (UCL)	122,29	117,76	115,39	113,97	112,68	111,84

Distribution/Subgroup size	2	3	4	5	6	7
Weibull (UCL)	120,41	117,12	114,99	113,51	112,31	111,68

Source: Own elaboration.

From the table, at first glance, it may seem to be negligible differences, but in control charts, these differences may cause a different interpretation of process stability. If the differences are too large, it can result to not capturing the non-standard situations, respectively. incorrectly identifies them. The visualization of the deviations from the normal distribution is in Figure 4.

Figure 4 **Upper and Lower Control Limits deviations from normal distribution**
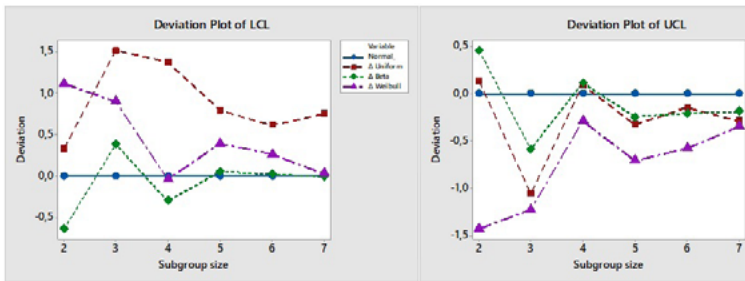
With the growing subgroup size, the difference in control limit values from the normal distribution decreases. Optically we could consider it a sufficient subgrop size of 5 or more. Lower subgroup sizes have a relatively high deviation from normal distribution and the risk of incorrect control chart interpretation is therefore higher.

3.2 The effect of sample size

The decreasing sample size reduces the accuracy of the control limits. Some authors' recommendations state that the sample should have at least 20 subgroups to allow for a relatively reliable calculation of control limits. For example, if there is a subgroup size of 4, we need to make at least 80 measurements (20x4). Random data for all types of distributions contained 420 theoretical values (measurements). For the highest subgroup size of 7 is the number of subgroups 60 (420/7). The range of data files is therefore sufficient.

What effect on the resulting control limit would have the gradual reduction of this range? As mentioned above, we have sequentially removed data fields, and the control limits have been calculated from decreasing data range. In Figure 5

there is a selection of comparison results for normal distribution with different subgrop sizes and for 4 types of distributions with subgroup size of 2. More results could be also displayed – the subgroup size ranged from 2 to 7 and 4 types of distribution (Normal, Beta, Uniform and Weibull). Only results for UCL are displayed, since formulas 1 and 3 shows that UCL and LCL is from scalar point of view identical.

Figure 5 **Effect of sample size, subgroup size (left) and types of distribution (right) on control limit values**
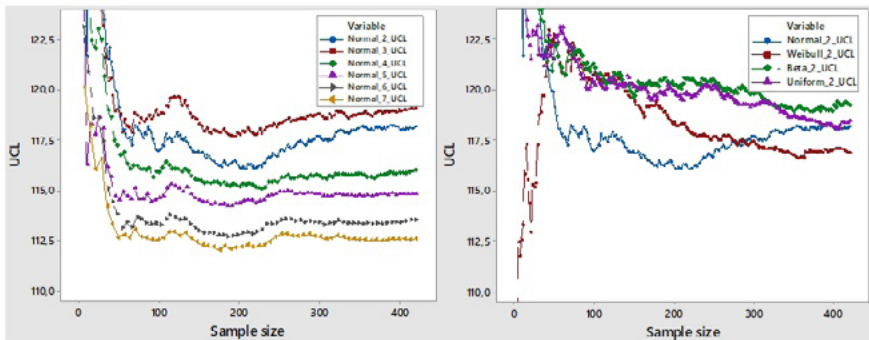
In the left part of Figure 5, it can be seen that the increase of subgroup size will increase the strictness of control limits (this does not apply to the subgroup size of 2 and 3). It is also interesting to note that with the increasing sample size the control limits become more stable. In the right part of Figure 5 we can also find another interesting finding. While in the normal distribution, control limits stabilize by increasing the sample size, in other types of distributions, increase of sample size will result to decrease of control limits.

The variability of the individual control limits with respect to the subgroup size is shown in Figure 6. The greatest variability of the calculated control limits belongs to the normal distribution and the largest to Weibull distribution. For practical reasons, it is desirable that the calculated control limits be the same regardless of other factors such as, for example, distribution type, sample size, and subgroup size. From this point of view, it really appears that normal distribution results to the most robust calculation of control limits.

Figure 6 **Boxplots of control limits variability under different conditions**
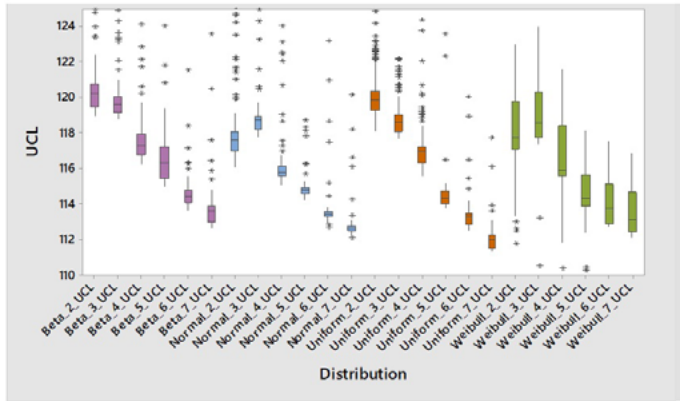
In addition to the graphical comparison, the numerical comparison of the results is better from the point of view of the report. The extent to which particular control limit values differ from each other has been verified through ANOVA. Normal distribution was considered a reference distribution. The results are in Table 3.

Table 3 **p-values of distributions comparison regarding to subgroup size**

Distribution/	Normal					
Subgroup size	2	3	4	5	6	7
Beta (2, 3, 4, 5, 6, 7)	0,000	0,024	0,000	0,000	0,002	0,001
Uniform (2, 3, 4, 5, 6, 7)	0,000	0,523*	0,004	0,028	0,143*	0,000
Weibull (2, 3, 4, 5, 6, 7)	0,980*	0,226*	0,088*	0,136*	0,412*	0,025

Source: Own elaboration.

In the table, it can be seen which types of distributions differ significantly from the normal distribution. Individual cases are marked with "*". It can be seen from the results that the calculation of the control limits is not a risky for the Beta distribution and in part even for the Uniform distribution. In the case of data with Weibull distribution, the resulting control limits differ significantly from the values obtained from the normal distribution data.

4   Discussion and conclusion

The creation of control charts also entails risks of methodological nature. This article aims to examine the impact of three non-normal distributions on the values of control limits in the most frequently used control chart - Xbar chart. Beta-type distributions (α = 2; β = 5), Uniform (a = 82,5; b = 117,5) and Weibull (λ = 1.5; k = 3) were examined.

For sample size 4 and above, the control limits in the normal distribution tend to stabilize. However, if data are not normally distributed, control limits will tend to decrease. The resulting control chart will thus have more tightly set control intervals. In sample size 4 and above, it was also found that the differences between the control limits are not so significant. However, it should be noted that while the variability of the calculated control limits in the normal distribution is relatively low, in Weibull distribution is variability significantly higher. If the data for the Xbar control chart has a Weibull distribution, there is a higher risk that the resulting control limit values will be incorrect. The results of this paper can be contrasted with past studies focusing on the calculation of control limits (Nedumaran & Pignatiello, 2001; Chen & Yeh, 2010), non-normality effect (Schoonhoven & Does, 2010; Lin & Chou, 2007), sample size (Quesenberry, 1992), or subgroup size (Torng & Lee, 2009).

From the practical point of view, the results of this study have two implications. The first is a determining of subgroup size. In general, there is no unique tutorial that could provide guidance to a precise subgroup size determination in Xbar control chart. Although this study does not provide such a guideline, the knowledge that subgroup size 4 and more is sufficient for stability control limits can be relatively valuable. The second implication is that data that do not differ significantly from normal distribution do not tend to determine incorrect control limits. The greatest risk is also the data whose histogram has a long "tail". An example can be seen in Figure 7 where a simple oulier test is performed.

Figure 7 **Grubbs outlier test of distributions with**
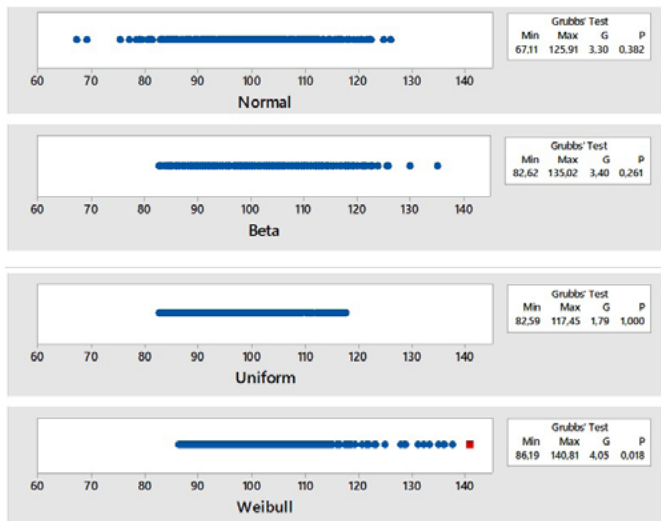
The presented article offers partial theoretical and practical answers to how particular types of distributions, different subgroup size and sample sizes affect the resulting control limits. The results are a brief summary of some selected types of distributions, but the presented approach may indicate possible paths for further research. Questions still remain open about other types of distributions and subgroup size of 8 and more. These themes can represent the potential of further research.

Acknowledgement

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INITIATIVES PROMOTING REGIONAL AND TRADITIONAL FOODS IN RURAL TOURISM IN POLAND

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Abstract

Poland is one of the EU member countries with the largest number of farms and the largest number of small farms. Although the number of farms is constantly declining and their average area is slowly, but growing, still the share of farms with an area of 50 ha or more is only 9% of their total number. The average size of a farm in Poland increased from 9.85 ha in 2010 to 10.31 ha 2016. Such a structure of farms causes an understandable tendency to look for farm diversification activities to generate additional, non-agricultural income for farm households. The most popular examples of farm income diversification in Poland include small scale food processing and rural tourism. Especially that farms with high landscape values are often located in the regions with the smallest farms. Small scale processing and traditional, local cuisine that is part of the cultural heritage of a given region together constitute an offer enriching the attractiveness of rural tourism. The aim of the paper is to discuss the activities linked with promoting regional and traditional foods in rural tourism in Poland and present examples of such activities as good practices.

Keywords: *traditional product, rural tourism, direct sales*

JEL Classification: *L66, Q10, Q12, Q13*

1   Introduction

In 2004, when Poland entered the European Union, many agricultural producers were afraid of the competition of more developed countries. However, it soon turned our, that the initial fear and feeling of insecurity became an advantage

(Marcysiak & Prus, 2017; Prus & Drzazdzynska, 2017). High fragmentation of farms and low use of chemicals naturally predispose Polish agriculture for the production of high quality, organic and natural foods, so searched for on the European tables. Since 2004, the food quality policy in Poland has played an increasingly important role. Poland actively participates in the European Union quality policy registering its food products in three types of quality categories, two linked to the relevant region the product comes from Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and one to the traditional process of production: Traditional Speciality Guaranteed(TSG) (Sieczko & Sieczko, 2011).

The system grants protection to high quality regional and traditional food products. It should be emphasised that Poland ranks first among the, so-called, new member states in terms of the number of the registered regional and traditional products. They are registered in the following categories: Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG) ("Rolnictwo i Gospodarka Żywnościowa", 2016).

Between 2007 and now (Feb, 2018), Poland registered 39 products, i.e. 8 PDO, 22 PGI and 9 TSG agricultural products and foodstuffs. In the procedure, i.e. considering applied and published stages, Poland works towards additional 4 products: 1 PDO, 2 PGI and 1 TSG logo, currently applied phase ("Agriculture And Rural Development", 2018).

According to Sieczko (2010) regional, traditional and local products are linked with culture of the specific regions of Poland. Their production constitutes a chance to improve the economic situation, especially of rural and small town inhabitants, assuring positive environmental, economic and social impact. It also fits into the concept of multifunctional development of rural areas, while assuring sustainable development (Paluch, 2014). As argued by many authors (Sieczko, 2010; Goryńska-Goldmann & Wojcieszak, 2013; Jęczmyk, Maćkowiak & Uglis, 2014; Jęczmyk 2015) regional and traditional foods constitute an important element in the development of rural tourism. It should also be underlined that one of the most popular tools of local economic development is the promotion of sales of local products (Horska, 2013), among others, in agrotourism farms. Agrotourism, in turn, by enhancing the prestige of a village or a community, increases the inhabitant's satisfaction of belonging to a local community, which enhances their participation and prevents rural depopulation (Niedziółka & Kowalska, 2015; Dziekański, 2016; Dziekański, 2017). It also allows to generate non-agricultural income, which indirectly and directly influences rural inhabitants' revenue (Kosmaczewska, 2009; Paluch, 2014).

The objective of the paper is characteristics of small farms cooperation in Malopolska region, in order to increase the attractiveness of the rural tourism offer and the possibility of selling organic and local products from small farms, unable to compete on the market individually. Thanks to working in a group, they can significantly expand their offer for a larger and broader group of customers.

2　Data and Methods

The principal objective of the paper is to attempt to discuss the activities linked with promoting regional and traditional foods in rural tourism in Poland, and present examples of such activities as good practices. In order to achieve the research objective, particular research methods had to be used. The research was composed of two stages - study of the existing literature and empirical research.

At the first stage, the method of literature search was used. As a result, the analysis of the existing literature was conducted in terms regional and traditional foods, entrepreneurship and rural tourism in Poland, using scientific papers, reports and analyses published by, among others, the Ministry of Agriculture and Rural Development.

In the empirical part, the case study method was used to analyse the collected data. The method assumes a holistic approach to the observation, reconstruction and analysis of the studied phenomena. What is more, it also enables to include the "actor's" view into the study (Zonabend, 1992). A case study is a summary or a synthesis describing a situation or events which took place, based on the combination of the conducted research and analyses, and the collected data. The objective behind a case study is to present information and experiences to people who have not been involved in the described situation. A case study does not aim at enhancing the reproducing of the existing models or setting universal standards of the best practices but should rather support practitioners and encourage them to search for appropriate solutions in a given situation, using other researchers' experiences and conclusions ("Studium Przypadku - Poradnik", 2010).

The case study presented in this paper allowed to draw conclusions regarding reaching economic effectiveness in the activity using local and regional products for the promotion and development of rural tourism. The knowledge achieved as a result of this case study can be practically used when planning similar activities.

3　Results and Discussion

The Polish tourism sector, thanks to the richness of natural and cultural values, offers a solid foundation for the development of tourism products. Their number

and diversity constitute the competitive potential of the Polish countryside and the engagement of people involved in the development of tourism products is a guarantee of success (Bogusz & Tomaszewski 2017). Unique characteristics of traditional and regional food products have an important role in creating and promoting a rich tourism offer. Local food produce gain a growing appreciation of consumers around the world. A constant growth in sales of local food products is observed, especially when it comes to direct sales, including sales in farms which is the shortest form of food chain, i.e. "from farm to fork" (Low & Vogel, 2011).

According to a study by A. T. Kearney (2013), the main reason behind the consumers' preferences is the belief that "it helps local economies (66 percent)" and, as a second reason, local food offer "a broader and better assortment of products (60 percent)". Consumers value their relation with a given region, as well as the ways of processing and preserving products, often linked with the region's culture (Sieczko, 2015).

The production of traditional foods is one of many ways in which farmers can search for additional sources of income. This pertains mainly to small agricultural producers from the south of Poland who increase their chances on the market by benefitting from the region's potential (Nowakowska-Grunt & Kiełbasa, 2017). Mutual cooperation in different areas (production, promotion, distribution) is a very good example of stimulating the activity of rural inhabitants. That is important especially in view of recent research showing that in Poland, apart from a few large food processing companies, there are many small entities with small production scale (Matysik-Pejas, Krasnodębski & Satoła, 2015). The production of traditional foods, therefore, increases the chances of the smallest producers, in particular.

One of the oldest forms of agricultural products distribution logistics, typical especially of small farms and allowing the producers to sell a wide range of agricultural products directly to the customer, is direct sales.

An innovation in terms of direct sales, which may be a good idea for people willing to get involved in such an activity, is the delivery of foods produced in organic farms directly to the households of clients living in big cities.

In 2007, the Association Grupa "odRolnika" (Eng. From the Farmer Group) was founded. From the very beginning, the group is made of eight agricultural producers with organic farming certificates. All of the farms are located in the Lesser Poland Voivodeship, situated in the south of the country, in the geographic area of the Carpathians, characterized by high fragmentation of farms. The aim of the project is: *direct sales of agricultural products from small and family farms in order to assure their further existence* („OdRolnika", 2017).

The area of agricultural farms varies from 1 ha to 20 ha of arable land, however, the majority of farms oscillates around the average for the Lesser Poland Voivideship, that is, around 3 ha. They are usually focused on fruit and vegetable production.

The „odRolnika" project includes the sales of:
- organic foods, produced under the supervision of a certification body,
- traditional foods, produced on a small scale and in an environmentally-friendly way, without the supervision of a certification body,
- products featuring on the list of traditional products, registered in the database of traditional products („OdRolnika", 2017).

Currently, the group provides the following forms of direct sales:
- online (delivery from the farmer directly to urban inhabitants),
- in a stationary store,
- during organic and local products fair,
- in the farms (during their open days) – the clients can pick their products directly from the field, pick them up from the farm or buy at a sales point located at the farm („OdRolnika", 2017).

The „odRolnika" project has been an incentive for many similar initiatives among farmers who wanted to maintain their farms but, due to small farm size, were not able to make their living from agriculture only. The project has also become a starting point for many initiatives such as promoting healthy food in agrotourism farms.

Over time, tourists became interested in the production process, which led to the creation of local products packages. The selected farmers from the Lesser Poland Voivodeship created tourism packages including 10 agricultural farms which host tourists interested in getting to know the local culture and traditions, based on the richness of organic food products.

It should be noted that all the packages were created in cooperation with the Local Action Group Dunajec Biała, which operates in that area. Currently, tourists can choose from 13 packages organised at different farms. The programmes take from one to a few days and include a diverse range of leisure. The packages are designed for both individual tourists and organised groups. Bookings can be made directly with the organiser of the selected offer, as well as in a tourist office (Bogusz & Tomaszewski, 2017). The fact that the packages are offered in the tourist office shows that they are prepared in a professional way.

One of the offers is a two-day package called "The Bean Adventure". The package includes: a visit to a Galician town, trip to a bean field, participation in

workshops about bean culture and tasting of regional bean specialties. The key of the programme is a feast where all dishes are made using bean (from drinks to main dishes and desserts). The package includes a night at an agrotourism farm as well.

The package is of particular importance because it promotes the "Piękny Jaś" bean from the Dunajec Valley, registered as a traditional product in 2006 by the Ministry of Agriculture and Rural Development („Lista Produktów Tradycyjnych", 2018). Thanks to the engagement of local producers and farmers, "Piękny Jaś" can be directly purchased as part of the „odRolnika" project. The bean is also present in the menus of restaurants in Krakow, among others, and every September it has its festival in Zakliczyn. In 2017, Zakliczyn hosted the 18th bean festival.

Local rural leaders do not want to stop there and, with the help of the Association Grupa "odRolnika, they launched the Local Product Centre (Centrum Produktu Lokalnego) in Rzuchowa. The idea behind the Center is to promote local products and, therefore, improve the quality of life in rural areas by satisfying social and cultural needs of rural inhabitants and promoting rural areas in general, especially within the area of the Local Action Group Dunajec Biała.

In June 2010 three farms started their "the parcel from the farmer" activity. At present, the group consists of 22 farms from the Małopolska and Świętokrzyskie provinces. 60% of them are certified organic farms. The average area of crops grown using the organic method is 1 up to 4 ha per farm. They produce vegetables, herbs and fruits and sell fresh or dried products.

Within the framework of the project, a modern Local Product Centre was build, which functions as a cultural and tourism centre. It includes a conference and training room for 60 people, and two smaller rooms for 30 and 15 people respectively. The Centre has been designed for the organisation of different exhibitions, tastings, workshops, lectures multimedia presentations, film screenings, conferences, festivals, thematic meetings, healthy cooking classes and many more. One of the rooms features a kitchen studio for the promotion of local products in culinary TV shows. Apart from that, the LPC deals with the promotion of local products, takes care of the image of local products and their producers, supports and coordinates the promotional activities of entities dealing with the production and distribution of local products, informs of the local products' values, participates in the processes of submission, registration and control, issues expert opinions and certificates for local products. The LPC also assures consulting in the field of local products promotion, in the wide meaning of the term. On the ground floor there is also a shop with local produce, such as fresh and organic fruit and vegetables from local producers. The shop is managed by local farmers who can directly sell their fruits and vegetables.

The promotional and informational, as well as educational activities implemented by the Centre, aim at building a strong brand of local products from the region and strengthen the position of local producers and manufacturers on the national market.

In order to understand the phenomenon of that multifunctional activity including: products directly from the farmer, rural tourism offer, promotion of local foods and many other initiatives undertaken by agricultural producers and rural inhabitants, one should meet their main organiser, Mr. Czaja, as well as other members of the team. All of them are very active. They are distinguished by ingenuity, ambition, activity, diligence, willingness to learn and ability to cooperate, that is, the key characteristics of entrepreneurial persons. And, at the same time, and perhaps above all, optimism and constant smile. They all want to promote their areas, organic farming and natural and cultural heritage by offering their agricultural produce or tourism packages.

Summing up, the case study presented above proves that tourism activity in rural areas is inseparably linked with regional cuisine. One should also underline that agrotourism in such areas is developed mainly thanks to the introduction of a rich offer of tourism packages, which assure not only leisure but also educational aspects, more and more searched for by tourists. Projects such as „odRolnika" or the Local Product Center are, in turn, a perfect example of multifunctional development of rural areas, while maintaining sustainable development.

The combination of agricultural direct and mail sale, as well as educational activities, allow to increase the number of customers, also obtained among guests, participants of educational programs implemented on the farm by members of the association. Educational programmes are directed to

- school children groups: presentations and workshops for school children, improving their
- knowledge on local agriculture, culinary traditions and local communities;
- families: offering presentations and workshops to all family members, for grandparents,
- parents and children, giving them an opportunity to spend time outside the city, and offer
- traditional, local and seasonal cuisine.

4   Conclusion

An increasing interest in rural tourism together with food offer based on local and traditional products can be observed not only in Poland, but also in other EU member states. The reasons for the development of rural tourism as a form of

small entrepreneurship can be searched for in a couple of phenomena. First of all, in the popularity of agrotourism and the contemporary trend for organic foods, having better and better marketing support, with particular emphasis on promotion as well as distribution, an example of which can be direct sales. Institutional support also plays an important role in this respect, especially, as described in the case study, thanks to various associations (Local Action Groups, agricultural producers groups) gathering local leaders, agricultural producers and small entrepreneurs.

To conclude, it is important to underline that rural tourism has become a particular, outstanding form of tourism in Poland, preserving the original cultural and natural character of the Polish countryside. The most important assets, being high tourist attractiveness of the rural areas and the EU membership, encourage new tourists. The presented case study, in turn, is a perfect example of how to promote one's region while maintaining the concept of sustainable development and the multifunctional character of rural areas.

Acknowledgements

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VALUE ADDED PROCESSES AT FOOD MARKET SYSTEM FOR DEVELOPING AND EMERGING INDUSTRIAL ECONOMIES: REVIEW PAPER

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Abstract

The goal of this paper is to introduce a comprehensive literature review on food supply chain from marketing, management and economics perspectives. The intensification of value added processes (VAP) at food market has positive socio-economic impacts on developing and emerging industrial economies. The paper presents both the theoretical and practical aspects of VAP at food market system, including economic and statistical data. The author recommends using VAP at food market system in order to modernize food-processing equipment, diversify food products, create job opportunities and establish food security.

Keywords: *food market, value added, socio-economic impacts, developing and emerging industrial economies.*

JEL Classification: *M11*

1   Introduction

Value added processes (VAP) at food market system are to transform primary agricultural commodities from their original form to a more valuable one. It is not only increasing values of the agricultural products, but also reducing deterioration risks, diversifying agricultural commodities and providing food security as well. Moreover, processed food products have longer food durability than raw agricultural products. In case of difficult periods caused by natural phenomenon,

food products with high value added are very important to moderate negative influences.

Publications focusing on VAP at food market system for developing and emerging industrial economies (DEIEs) can be found in studies of Dani, S. (2015), Anderson, D.P. and Hanselka, D. (2009), Goletti, F. and Samman, E. (2002). The studies conducted on value added processes, food supply chain from management, marketing and social perspectives, exporting high-value food commodities, as well as post-harvest systems in world agriculture in general. Anderson and Hanselka (2009) state that value is usually created by focusing on the benefits associated with the agribusiness product or service that arise from quality, functionality, form, place, time and the ease of possession. A product should have one or more of these qualities to generate additional value. As for Dani (2015), food sector is able to make innovations in food products, business models, packaging, technology, which adds value in the supply chain. Goletti and Samman (2002) claim that processed agricultural products have provided a crucial source of export revenue to developing countries, particularly in the light of the long-term trend towards declining prices for traditional agricultural commodity exports. With increasing population of the world, demand for agricultural production also grows due to provide food sources for humanity. Agricultural development is highly differentiated and production is concentrated in economically developed countries that achieve high production efficiency, labour productivity and low employment. Except developed countries, the share of agriculture in national economy is also crucial in less developed countries (Nagyová, et al. 2016). Similarities due to common historical, political and cultural background form the first supposition for better understanding of intercultural differences and business distance, and consequently contribute to further trade development (Galova, 2013). The success of the new product on the market depends on well-developed communication strategy (Kubicová and Kádeková, 2011).

VAP at food market system for DEIEs can be described from marketing, management and economics perspectives. The marketing of food supply chain specify the increasing the value of food products while passing through the stages of being developed, processed or produced by using e-business in food value chain, new methods of technology or recipes, communication, labelling, packaging, advertisement etc. Moreover, the main two factors such as food product quality and cost have significant impact on the buying behaviours of customers. Quality of products may be considered as a significant factor that contributes to creating a strong image in today's highly competitive environment (Šugrova, et al. 2017). When analysing food consumption in developed and developing countries, it can be seen that people in developed countries buy more processed foods than people

in developing countries. There is positive correlation: the more the country is developing, the more people are consuming processed food and vice versa.

There are the long chain of intermediaries as well as existing waste issues after processing raw agricultural commodities in the most of developing countries. Therefore, producers depend on effective management, which shorten a long food supply chain and environmentally friendly ways to dispose of waste. Activities during preparing finished food products are divided into value add and non-value add (overproduction, transportation, over-processing, inventory, creativity, waste control). Both of them require cost and time from producers, but customers pay only for value added activities (Ohno, 1988). For this reason, producers try to minimize costs in order to satisfy customers with the price of food products. The common practice of food supply chains in developing countries shows that farmers harvest crops and sell them to collectors. In turn, they add hired labor, taxes, financial and fixed costs to the farmers' price and resell to processors for preparing finished products. The next step is to deliver ready-to-use products to retailers, who also add their value and finally present the product to the consumers. It is recommended to shorten these procedures by involving farmers in agribusiness, so that farmers will have the opportunity to sell their products directly to consumers.

2   Data and Methods

The most of DEIEs have a high dependence on the export of raw agricultural commodities. This can lead to economic crisis due to the unstable prices of agricultural commodities in world market. The intensification of value added processes at food market has positive socio-economic impacts on DEIEs. Value added processes at food market system play important socio-economic role in DEIEs by supporting people with job opportunities and improving infrastructure. The economic advantages of value added processes are increasing the share of finished goods in export, supplying import-substituting products.

As stated by the Industrial Development Report 2016, manufacturing remains the main driving force of economic growth, largely attributable to its higher productivity and scope for innovation as well as the fact that over the past few decades, the majority of global manufacturing has steadily shifted from West to East and from North to South. The report also informs that since the beginning of the century, rapid growth in the manufacturing value added has been a major source of poverty reduction in many developing and emerging industrial economies through employment creation and income generation. Based on statistic calculation, the IDR 2016 has forecasted positive scenario in which DEIEs still

have considerable capacity for manufacturing growth and technological progress in the coming decades. However, such a rapid growth of DEEIs is the expense of certain countries such as China, India, Mexico, Brazil and Turkeý (Figure 1).

Figure 1 **Manufacturing value added share of the five largest countries in developing and emerging industrial economies' group total, 1990, 2000 and 2014**
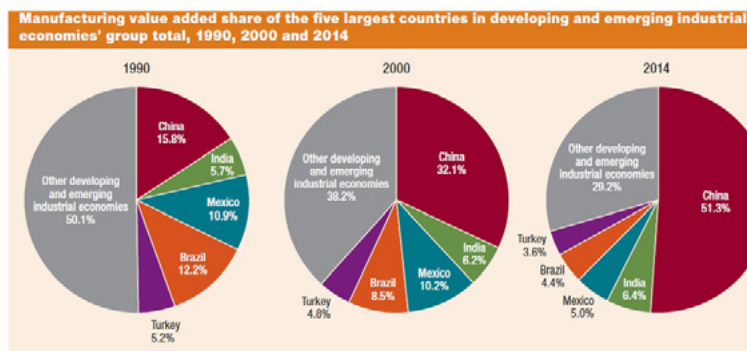
Source: United Nations Industrial Development Organization, 2015.

China's impact on the manufacturing value added growth rate in DEIEs is very important, as the country's share increased from 15.8 % in 1990 to 51.3 % in 2014 (UNIDO, 2016). The share of value added agriculture on the GDP in 2014 reached the value 3.1% globally. In comparison to other sectors of the world economy (industry and services), this share was very low (Rovný, 2016). Analyzing the sectoral composition of world manufacturing value added in 2000, 2005 and 2013, food and beverages have the highest share in three years in the world. It shows the food market system has been before and will be still the most important sector in the future (Table 1).

Table 1 **Share of manufacturing value added, by industry group within country groups and worldwide, 2000, 2005 and 2013 (percent)**

International Standard Industrial Classification (ISIC) description	Industrialized countries			DEIEs			World		
	2000	2005	2013	2000	2005	2013	2000	2005	2013
Food and beverages	11.0	11.4	11.2	16.6	14.9	13.3	12.1	12.2	12.0
Tobacco products	1.1	0.9	0.7	3.5	2.9	2.5	1.6	1.4	1.4
Textiles	2.3	1.8	1.1	5.9	5.3	4.5	3.0	2.7	2.5
Wearing apparel, fur	1.7	1.0	0.7	3.8	3.4	2.9	2.1	1.6	1.6

International Standard Industrial Classification (ISIC) description	Industrialized countries			DEIEs			World		
	2000	2005	2013	2000	2005	2013	2000	2005	2013
Leather, leather products and footwear	0.7	0.4	0.3	2.0	1.4	1.3	0.9	0.7	0.7
Wood products (excluding furniture)	2.0	2.0	1.5	1.7	1.4	1.4	1.9	1.8	1.5
Paper and paper products	3.0	2.8	2.4	3.0	2.9	2.7	3.0	2.9	2.5
Printing and publishing	4.6	4.2	3.4	2.1	1.8	1.4	4.1	3.6	2.6
Coke, refined petroleum products, nuclear fuel	3.1	3.5	3.2	6.2	5.2	3.7	3.7	3.9	3.4
Chemicals and chemical products	11.0	12.0	12.0	11.2	11.2	11.1	11.0	11.8	11.7
Rubber and plastic products	4.7	4.6	4.4	3.4	3.5	3.3	4.5	4.3	3.9
Non-metallic mineral products	4.0	3.8	3.1	5.5	5.4	5.8	4.3	4.2	4.2
Basic metals	5.0	5.0	4.5	7.8	10.0	11.2	5.5	6.2	7.1
Fabricated metal products	8.0	7.5	7.1	3.9	4.0	4.6	7.2	6.6	6.1
Machinery and equipment (not elsewhere classified)	9.7	9.7	9.2	4.8	5.9	7.4	8.8	8.7	8.5
Office, accounting and computing machinery	1.5	1.4	2.0	1.2	1.5	1.5	1.5	1.5	1.8
Electrical machinery and apparatus	4.0	3.8	3.9	2.8	3.3	4.5	3.8	3.6	4.1
Radio, television and communication equipment	5.2	6.2	9.7	3.7	4.6	5.1	4.9	5.8	7.9
Medical, precision and optical instruments	3.5	3.9	4.7	0.7	0.9	1.1	3.0	3.1	3.3
Motor vehicles, trailers, semi-trailers	7.7	8.3	8.3	6.2	6.4	6.7	7.4	7.8	7.7
Other transport equipment	2.9	3.0	3.8	1.5	1.7	1.9	2.6	2.7	3.1

International Standard Industrial Classification (ISIC) description	Industrialized countries			DEIEs			World		
	2000	2005	2013	2000	2005	2013	2000	2005	2013
Furniture, manufacturing (not elsewhere classified)	3.3	3.0	2.7	2.3	2.3	2.1	3.1	2.8	2.5
Total	100	100	100	100	100	100	100	100	100

Source: United Nations Industrial Development Organization, 2015.

The demand for food and beverage products is growing due to increase in the number of the world population each year as well as these products being the main source for life. Continuing to produce more high value added agriculture products and encouraging investment to this sector improve other related branches: people welfare, rural development, and infrastructure.

3 Results and Discussion

There is a need to run agribusiness in rural areas, i.e. small and medium enterprises (SMEs) close to farms are required to open up, so that farmers will have the opportunity to sell their products directly to customers. It creates job vacancies, extra farmers' income, and suitable economic infrastructure in rural areas as well as acceptable price for customers. To improve socio-economic development in rural areas, DEIEs with agriculture advantage should pay attention more on value added processes at food market system and create conditions (organizational, legal and regulatory bases) for involving farmers in agribusiness.

4 Conclusion

The common practice of long chain of intermediaries should be reduced by implementing the practice "from farm to fork". In other words, there is a need to attract farmers to open small food processing companies close to their farms. In this case, the price of food products is minimized as well as customers have food products with acceptable price. Secondly, value added processes at food market system play important socio-economic role in DEIEs. The economic advantages of value added processes are increasing the share of finished goods in export, supplying import-substituting products, improving infrastructure and growing people's income. Currently, the rapid growth of manufacturing value added among

DEIEs appertains to China, India, Mexico, Brazil and Turkey. The other DEIEs should also improve value added processes at food market system by establishing tax incentives and allocate preferential credits for agribusiness.

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TRENDS OF FORMING AGRI-FOOD CHAINS OF VALUE ADDED IN UKRAINE

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Abstract

The scientific and methodological principles of agro-food chains functioning in Ukraine as an economic system, which consists of numerous participants, which promote bringing of products to the end user on basis of providing additional services, are systematized. The main production, market and institutional tendencies and environment for interaction in creating effective chains of value added and attracting them to small-scale agricultural producers are analyzed. The proposals for increasing added value in the grain chains based on diversification of grain use in production of livestock products are developed. It is proved that the maintenance of competitiveness of domestic agro-food chains will contribute to the implementation of quality and safety management systems in agricultural enterprises for cultivation of products of plant and animal origin.

Keywords: *agri-food chains, added value, integration links, agricultural market infrastructure, PLM system*

JEL Classification: *Q10, G35*

1   Introduction

Market transformations in the agri-food sector of Ukraine's economy, as well as globalization processes and European orientation of the country, bring about the necessity for search for directions of formation of competitive agri-food chains. It is obvious that ensuring profitability of agrarian enterprises in a competitive environment is achieved mainly through cost management and formation of added value of products in agri-food chains. Under current conditions, full value functioning of agri-food chains, which create high indices of added value, is provided

by vertically-integrated structures. However, the issue of increasing value added by small commodity producers, in particular through the involvement of the latter in integration associations, as well as provision of high quality and safety of agricultural products and foodstuffs, as well as improvement of relations between participants in chains based on the principles of long-term partnership and transparency, remain unresolved.

Studying the peculiarities of functioning of agri-food chains is vital for Ukraine and allows to evaluate relations between all actors within them, and helps to understand economic and social benefits and losses in these relations for all participants. On the other hand, the analysis of the agri-food chain shows where the largest added value is formed, accumulated and realized, and gives the opportunity to establish relative importance of different actors in this process, both inside and outside the chain. This approach includes analysis of the institutional environment that promotes the development of key actors in the chain and allows to substantiate the directions of achieving rural development goals when agricultural producers are involved in the process of obtaining their part of added value.

2   Data and Methods

The methodology of this research is based on the theory of chain approach, developed by M. Porter, G. Gereffy, M. Moris and R. Kaplinski. It is also based on the evaluation and analytical works, on the generalization of expert and practitioners' ideas in Ukraine's agri-food sector. The research includes the analysis of modern trends and institutional environment in agriculture, processing industry and trade, peculiarities of agri-food chains formation. We have used scientific works of key foreign and national scientists, research results of state research and statistical institutions related to production, processing, commercialization and consumption of agricultural products and foodstuffs. The additional information was received from regional agricultural authorities, technical assistance projects, associations and international donor organizations, operating on the territory of Ukraine. All these data allowed to carry out empirical research on the functioning practice of added value chains in some agro-food sectors.

3   Results and Discussion

Foreign scientists define agri-food supply chains as "a set of interconnected companies that work closely together to target the flow of goods and services across the whole chain of value added of agricultural and food products, which

will bring this flow to consumers at the lowest possible cost" (Beske, 2014), or as "an activity that covers the stages from production to distribution, which ensures bringing products to final consumers" (Aramyan, C., 2006). At the same time, the agri-food chain is the basis for conducting the analysis of managerial activities of the enterprise in relation to bringing the product from production stages to final consumers (Gereffi, 1999). In addition, the agri-food chain is considered through activities that include "production of input materials used for agricultural production, processing, wholesale trade and logistics, retail trade and final consumers" (Mattiacci and Vignali, 2004). It is worth paying attention to the approach to managing the agro-food chain, which involves coordinated and targeted activities to fully meet the needs of consumers (Mikkola, 2008). Under the current conditions, an important requirement is to guarantee not only the quality and safety of agricultural food, but also respect for the principles of sustainable development. In this direction, it is of importance to develop innovative products that are different from traditional ones, that is, innovations should lead to development of new production technology and emergence of the market for bio-products, as well as functional food products that are more useful (Caiazza and Volpe, 2012). We believe that the most complete definition of agri-food chains is proposed by FAO (United Nations Food and Agriculture Organization): it is a set of agricultural producers and organizations (or actors) that consistently coordinates creation of added value in production of certain types of agricultural products and their processing for the purpose of obtaining food products sold to the final consumer and after consumption are sent to waste, ensuring profitability at each stage, creating wider benefits for the society without permanent depletion of natural resources (FAO, 2014).

At the same time O. Borodina defines agri-food chains as not simply interrelated links of one process (including six stages: from producers of raw materials to consumers of final food products), but also (and above all) as mutually beneficial links between groups of producers, sellers, processors and service companies that unite together to increase productivity and create value-added based on understanding of common benefit and equitable distribution of the results achieved. The implementation of the concept of agri-food chains formation can positively affect incomes and employment in the agri-food sector by providing access to the market for small-scale agricultural producers and establishing business ties with small and medium-sized processing enterprises (Borodina, 2014). Consequently, the above-mentioned definitions of agri-food chains allow us to distinguish the following key components: production of raw materials, supply of products, transportation logistics, economic feasibility, creation of value added, sustainability of operation.

It should be noted that in the process of studying existing interpretations of added value we have identified the concept of "value chain" introduced by M. Porter, which in other scientific works is called value added chain (Porter, 2000). He introduced the value chain as an agreed set of activities that create value for the enterprise, from its input sources of raw materials to finished products delivered to the consumer, including its maintenance and utilization of waste. Consequently, the chain of creating value involves economic processes that generate value added (production, logistics, marketing, provision of additional services).

The notion of value chain is treated as a process of adding value to a product that begins with purchase of material and technical elements necessary for production, and ends with sale of goods and services to customers (Chukhray, 2008). Thus, the definition of the value chain based on a set of value added activities that are geared towards more complete satisfaction of consumers' needs is found in (McCormick, 2000; Sturgeon, 2001), the definition of cost based on the cycles of its creation involves allocation of production, marketing and logistics processes that are responsible for the formation and implementation of the appropriate value (Baker, 1985).

Consequently, the agri-food value added chain is an economic system consisting of different chain operators represented by suppliers of raw materials, providers of services, agricultural producers, processing organizations, distribution logistics organizations, marketing firms that promote delivery of products to the final consumer on the basis of providing additional services. That is why added value of the agri-food chain is considered by us as value of goods formed during the process of agricultural production, processing, storage and sale in the enterprise, which requires its transparent and equitable distribution among all the participants in the technological chain. Value added to the product includes labor costs, depreciation, taxes and profits.

Let us consider the potential of Ukraine's agri-food sector in shaping the increased value added. One of the ways of resolving this issue under domestic conditions is extension of agri-food chains, which will allow to export finished farm products instead of agricultural raw materials. In addition to an important social function, the production process in the agrarian sector provides a stable inflow of currency to the national economy, forms a raw material base for the development of processing industry and determines one of the main specializations in the world market. In general, the share of the agri-industrial complex in the structure of total export volumes has a steady tendency for growth. Since 2000, Ukraine has witnessed a tendency to increase the volumes of gross agricultural and food production, in particular, from 2005 to 2016, the gross agricultural output increased by 30%. At the same time, there is a steady increase in export volumes in the agrarian sector (an increase of 28%) and a positive foreign trade balance.

The growth of production of export-oriented agricultural products is accompanied by deformation of sectoral and product structures of production. It is established that among the export-oriented agricultural branches the highest value added index is formed by production of sunflower oil, (in 2016, the supply of Ukrainian oil accounted for 54.8% of world exports). The next export-oriented chain is grain (in 2016, 39 million tons of export), but it is characterized by formation of low value added, as the object of delivery is grain (Figure 1).

Figure 1 **Dynamics of the structure of export of agri-food products by volume of cash receipts, %**
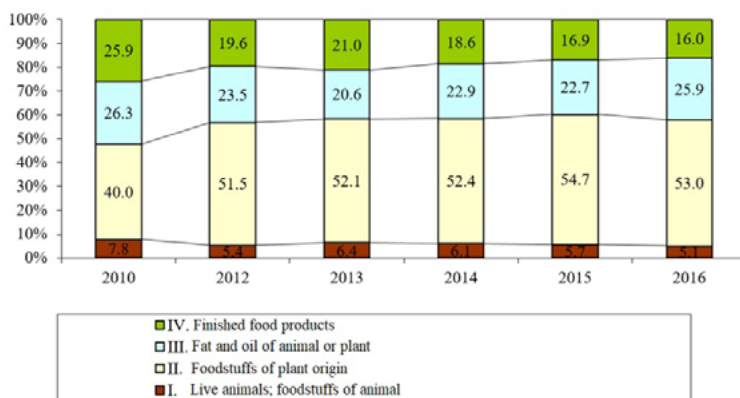
Source: Calculated according to the State Statistics Service of Ukraine.

The data presented in Figure 1 indicate that during the research period, the growth of the share of crop and livestock production, which in 2016 amounted to 53% and 5.1% correspondingly, is considered to be a negative tendency. In addition, the share of food products in the structure of exports does not take a prominent place in 2016, only 16%, or decreased during the research period by 9.9 pp. Consequently, the given data convince us about the necessity of forming added value while exporting products due to the increase in volumes of food products export.

The positive dynamics in provision of value added growth are observed in the egg chain, where a limited number of producers (three powerful agrarian holdings) provide up to 75% of egg production and almost 100% of products of deep proccesion. As for other livestock sector chains, they are mainly oriented at the domestic market and are unable to generate value added gains due to the inability to guarantee quality and safety of products.

In order to extend the agricultural chain, it is necessary to create favorable conditions for investing in new technologies of grain processing, in the development of infrastructure and logistics. It should be noted that significant export volumes of certain types of crop production to date have objective preconditions. The domestic market is not able to absorb the entire volume of supply, and therefore, nowadays, significant volumes of grain exports and certain types of oilseeds are quite a logical phenomenon that "unloads" the domestic market, prevents price reduction and ensures the inflow of currency to the country and financial resources in agricultural sector.

We have calculated the effect of increase of value added on the basis of comparing the effectiveness of existing and potential uses of crop products produced in Ukraine on the example of grain and soybeans in terms of finding options for increasing value added inside the country (Bodnar&Shpichak, 2013; Bodnar&Pedorchenko, 2015).

As the experience of the leading countries of the world convinces us, there is an economic expediency to diversify the use of grain produced, which ensures a higher competitiveness of the country in different conditions of the world market. Thus, global producers and exporters of grain, at full satisfaction of domestic needs in grain and livestock products, export not only grain crops, but also supply to the world market dairy and meat products, bioethanol, for which grain is used, and by doing this they occupy their niche in the world's distribution of labor. For example, in France, 1094 kg of grain is produced per person, which is 14% lower than the best Ukrainian indicators, the share of grain exports in production is 51%. The level of meat consumption in this country is 86.7 kg, milk consumption is 246.6 kg, which is correspondingly 70 and 17% more than in Ukraine. At the same time, France exports livestock products 24.3 kg of meat and 165.5 kg of milk per 1 person.

A similar situation in Ukraine took place in 1990, in particular, it produced 981 kg of grain per capita, with its export of only 3 million tons, while the amount of feed stock was 28 million tons. With the provision of domestic consumption of meat at the level of 68 kg and milk at the level of 373 kg, 5.2 and 2.2 times more of these products were exported outside the country. Currently, the capacity of the domestic grain market in Ukraine is limited due to the low purchasing power of the population.

It is obvious that the increase in the purchasing power of the population will determine the need to expand the use of grain: to meet domestic needs at the level of rational norms, including livestock products, grain and livestock exports, and the use of cereals to produce bioethanol. This will result in manufacturing products with significantly higher value added. Ukraine already has the experience

of reorientation from export of raw materials, in particular sunflower seeds, to export of sunflower oil, a product with higher added value (Table 1).

Table 1 **Calculation of variants for formation of incremental value added (on the example of grain)***

Indicators	Cereal total	Wheat	Barley	Corn
Grain production				
Amount of product, thousand tons	100	23	11	66
Sales price, UAH for 1t on including VAT	x	3367	3195	3581
Share of value added in production, %**		50,5	45,5	46,5
Added value created while producing grain, UAH million	164,9	39,1	16,0	109,8
Grain export				
Price FOB, UAH per 1 ton	x	3550	3825	3755
Share of value added in export logistics, %	48			
Added value created when exporting grain, UAH million	32,2	4,0	7,3	20,9
Total value added when producing and exporting grain, UAH million	198,4			
Alternative variants of grain use in livestock production	Milk production		Meat production (pork)	
The amount of product that can be obtained when using 100 thousand tons of grain, thousand tons	258,4		18,6	
Sales price of livestock product, UAH for 1 ton including VAT	5336		29617	
Share of value added in production, %**	48,7		38,1	
Added value created while using grain in livestock, UAH million	219,5		270,8	
Total value added when producing and processing grain for livestock product, UAH million	384,3		436,2	
Increase in aggregate value added created while producing and processing grain for livestock product in comparison with export, times	1,94		2,20	

Indicators	Cereal total	Wheat	Barley	Corn
Increase of value added while processing already harvested grain for livestock product in comparison with export, times	6,80		8,40	
The number of additionally created jobs	900		400	

Source: Calculated according to the State Statistics Service of Ukraine.

* on the example of 100 thousand tons of grain and in the conditions of the year 2015
** the indicator adjusted in compliance with the production structure according to categories of farms

The next direction in ensuring increase in value added of agri-food chains is involvement of small commodity producers of agricultural products into competitive integration chains. It is known that in Ukraine a large part of the individual sector is included in agricultural activity and a large part of rural population exists due to family farming (although it is not officially called so). Thus, it cannot be assumed that 2.6 million rural residents at the age of being economically active, who currently produce agricultural products on private farms, will potentially be included in chains. In particular, 40% of rural households with insignificant resources that produce foodstuff for their own consumption (self-sufficiency) can potentially not be included in supply chains. We believe that in order to create conditions for attracting private peasant farms to competitive agricultural chains, it is necessary to introduce wide-ranging measures of rural development, including creation of non-rural workplaces in rural areas.

It is obvious that integration of small agricultural producers into modern chains of supply of necessary materials, technology, capital and marketing of manufactured products will increase the possibility of access of the individual sector to markets that will ensure full use of potential opportunities regarding prices and revenues. Therefore, corporate structures should be interested in initiating processes for attracting small-scale producers to agri-food chains. That is why, a system of economic incentives for these structures to interact with small and medium-sized producers should be introduced on the basis of tax exemptions, which are now unjustifiably used by corporate structures. In addition, support for the development of agricultural co-operation is one of the areas for strengthening the market power of small commodity producers on the basis of their group participation. The benefits of group participation in chains are obvious; for the agro-enterprise and other chain members, cooperation with a group

is more attractive than with a large number of small producers; for a group of small producers it is possible to get more benefits from integration to combine their resources and access to credit and services in order to introduce innovative technology and ensure competitiveness of products.

We believe that in order to increase the competitiveness of agri-food chains, which are created by small agricultural producers, it is economically feasible to organize processing of raw materials. Currently, the majority of small and medium-sized agricultural enterprises do not have the capacity to harvest and store harvested crops, which makes it necessary to sell to intermediary structures during the harvesting campaign, when the level of purchasing prices is the lowest.

For example, vertically-integrated structures have elevators in their structure, which makes it possible to store grain and sell it in the period of maximum prices. Most vertically-integrated structures independently sell products to final consumers, including the foreign market, receiving additional income in the form of VAT refunds, as well as the difference between prices on the domestic and foreign markets.

Among the main factors that prove the economic feasibility of diversifying production through establishment of in-farm processing are as follows: a strong source of raw materials and availability of free production facilities; orientation of commodity producers towards a fuller and more efficient use of production potential; financial factors need for cash, risk minimization, financial stabilization; surplus of skilled labor (due to seasonality of agricultural production, general decline of dynamics of the industry); the need for prompt response and flexible adaptation to changing market conditions; the need for a perfect competitive environment and elimination of the monopoly of processing enterprises.

Introduction of systemic safety methods in agricultural enterprises will ensure competitiveness of agri-food chains. Cultivation of products of plant origin and breeding products of livestock origin will largely depend not only on the level of compliance with the minimum requirements of basic programs, but also on the interest of food processing enterprises in obtaining safe and quality raw materials. Under the current conditions, creation of agri-food chains takes place without a clear identification and appropriate fixing of specific obligations in the Agreements. Neither the specifics of economic relations and technological requirements on both sides are taken into account in order to bring products and food processing production to regulatory parameters. This issue is unresolved in rural production, which has 77.4 thousand subjects, however, only 1.1-1.5 thousand agricultural enterprises have implemented Safety Systems (HACCP or DSTU ISO 22000: 2007), or conducted an audit regarding conformity of production to minimum requirements of the basic programs (ISO / TS 22002-3: 2011 Program of mandatory preliminary measures for food products safety).

4   Conclusions

One of the directions for increasing value added of agri-food chains is the diversification of the use of agricultural products in compliance with alternative options for increasing value added within the country. In particular, it is proved on the example of grain that when it is grown and processed for production of milk or pork, aggregate added value is created, which is, correspondingly, 1.94 and 2.20 times higher than the aggregate value added created while only producing and exporting grain. In addition, with the use of 100 thousand tons of grain for production of pork, creation of 400 additional jobs is provided and for production of milk 900 additional jobs. Moreover, under domestic conditions, the possibility of increasing value added created by small forms of agri-business is not used, which, through the development of agricultural co-operation and integration with large commodity producers, can increase the economic strength in the market of agri-foodstuffs and promote rural development.

Integration of Ukraine into the European Union increases the need to address the issue of compliance to regulatory parameters of quality and safety of food raw materials by agricultural producers, where there are no functional management systems. The gradual adaptation of the agrarian sector of Ukraine to European requirements regarding safety and quality of food products is a prerequisite for development of regional and national agri-food chains to a transnational level, which will facilitate a rapid access of food products to European markets, and creation of added value and new opportunities for small producers to have an access to these markets.

The following areas of study of the problem of value added in agri-food chains should be the study of practice and justification of introduction of a closed technological cycle of non-waste production of quality and safe agri-foodstuffs on the basis of innovations, for which it is expedient to use production and technology modules of a closed cycle developed by world-wide practice that allow introduction of PLM system (product lifecycle management). This is confirmed, for example, by the fact that in Ukraine only 30% of the by-product of crop production is used and contributes to formation of value added.

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SESSION 4

BIOECONOMY, RESOURCE MANAGEMENT AND SUSTAINABLE DEVELOPMENT

EXPENDITURE ON ENVIRONMENTAL PROTECTION, TAXES AND INNOVATIONS AS DETERMINANTS OF THE LEVEL OF SUSTAINABILITY IN AGRICULTURE

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Abstract

The issue of sustainable development occurs in almost every kind of activity among all sectors, including agriculture as well. At the moment, the agriculture is facing many challenges, not only in the form of higher productivity, efficiency or consolidation, but it should also fulfil some certain criteria which are related to sustainable development. Today, agriculture should be more ecological, use resources in a more efficient way and try to use renewable sources instead of non-renewable.

But it is not all, the sustainability of agriculture could be also measured by certain expenditures such as environmental protection, taxes and innovations, which can also describe the level of sustainability in agriculture. Having in mind that agriculture is one of the most important sectors in all EU countries, it is worth to conduct such an analysis, which allow determining the level of sustainability in agriculture among all EU countries. Thus, the purpose of the article is to check the level of these expenditures in order to outline in which UE countries a sustainable agriculture is present.

Keywords: *sustainable development, sustainable agriculture, analysis, expenditures, environment protection, taxes, innovation*

JEL classification: *N53, O13, Q15*

1   Introduction

Agriculture in all EU countries continues to be a very important sector of the economy, next to the food, fisheries and forestry industries, it is one of the most important elements of broadly understood agribusiness. Agriculture and rural areas play a key role in the economic and social development of developing countries (Brzozowska, 2014). The agricultural sector is supposed to fulfil several goals together with societal values, such as increased food production, preserving and developing cultural heritage or climate change and recreational values, while at the same time being both economically and sustainable viable on a long-term basis (Lindbloom et al. 2017). Consequently, there is a need for a conscious agricultural policy aimed not only at the further development of agriculture, ensuring the continuity of food supply, but also guaranteeing adequate financial profits for farmers, reducing poverty but also ensuring food security ("The Common Agricultural Policy).

In 2011, CAP's reform took place, as a result of which a 10-point plan was drawn up and its main objective was to strengthen the economic and ecological competitiveness of the agricultural sector, support innovation, counteracting climate change and supporting employment and growth in rural areas (Wąsag, 2010). In turn, as the result of the next reform was the adoption a broader and strategic approach to the CAP. It will be primarily concentrated on the environmental, social and economic challenges implementation, which is in line with the Europe 2020 strategy objectives for smart and sustainable development(Rozwój lokalny…, 2017).

The food production goal will be achieved through an appropriate and stable level of income, strengthening the farms' competitiveness and supporting areas with unfavourable natural conditions. The Sustainable Natural Resources Management goal will be implemented by guaranteeing sustainable production activities, promoting the so-called green development and carrying out activities aimed at mitigating the effects of climate change. In turn, the Sustainable Development goal will be implemented through the rural areas activation, employment growth, promotion of diversification and creation of conditions for social and structural diversity in rural areas (CAP until 2020, 2017). Looking through the above-mentioned goals, it can be noticed that the concept of sustainable development has been presented in programs or projects aimed at strengthening agriculture, for many years, to a greater or lesser extent. And over the years, it is becoming clear that this issue is gaining importance.

Awareness of the close development of agriculture with the concept of sustainable development manifests itself in emphasizing the essence of this concept

in many documents related to the development of agriculture and rural areas. Reference to the concept of sustainable development can be found in the CAP (Common Agriculture Policy), which as a result of the reform of 1992, put on the farmers a responsibility for environmental protection and sustainable agriculture, and for the reasonable use of our natural resources, soil, air and water. These tasks have translated into practical activities such as diversification of crops, maintenance of permanent grassland and less intensive production (Wspólna polityka rolna…, 2012). And not to mention, that in order to achieve Sustainable Development Goals, much stronger attention to sustainable agriculture practices should be put (Braun et al, 2017).

This concept is even more important for agriculture and rural areas that directly affect the natural environment (Marsden & Sonnino, 2009). Due to the close link between the agriculture development and the development of rural areas, it is impossible to talk about the sustainable development of these areas without sustainable agriculture (Żmija, 2011). Sustainable agriculture implies an integrated system with a long-term outlook, one that is concerned with the different factors that contribute to a quality of life, the improvement of the environment, the efficient use of non-renewable resources, and the increased use of renewable alternatives (Gosetti, 2017).

Sustainable agriculture development, which is a key element of sustainable rural development, as defined by the FAO Food and Agriculture United Nations in 1987, is the use and conservation of natural resources and the orientation of technology and institutions to meet human needs and future generations (Sydorovych & Wossink, 2008). Another definition specifies that sustainable agriculture implements, simultaneously and harmoniously, production, economic, environmental and social goals (Faber, 2001). The agriculture development also depends on the social inclusion, health, climate changes, energy, ecosystem processes, natural resources, good supremacy, etc., must also be documented in specific target oriented goals. Therefore, sustainable agricultural strengthening the practical opportunity to get rid of poverty and hunger of the people (Prasad et al. 2017).

Sustainable agriculture as one of the fields of sustainable rural development and an alternative to intensive industrial farming should rationally manage the land resources so that they can benefit from it and meet their needs for future generations of producers and consumers as well. Its essence is to strive for a stable and, at the same time, economically viable and socially acceptable production in a way that does not harm the natural environment.

2   Data and Methods

Having in mind the above, this article contains an analysis, whose obtained results, may become an answer to which extent agriculture in all EU countries can be perceived as a sustainable one. The conducted analysis concentrated on the following issues:

■ Environmental protection expenditures incurred by the agricultural sector of all EU countries,
■ Environmental taxes incurred by the agricultural sector of all EU countries,
■ Innovation expenditures incurred by the agricultural sector of all EU countries.

Unfortunately, in case of agricultural environmental protection expenditures, only four countries have provided the appropriate data – thus the table with the results includes the data from these countries only. For the rest – all UE countries have provided the data and information, thus made it possible to conduct such analysis.

In order to fulfil the purpose of the article, which is the attempt to determine the level determine the level of sustainability in agriculture among EU countries, the following methodology was adopted:

At first, we have checked the data, provided by the Eurostat, in order to determines the following issues: number of farms in EU countries, total farm's area, standard output, labour force directly employed in agriculture castor and the total production of crops, milk and meat, which are the basic products of agriculture. Then we have checked the expenditures on: agriculture environment protection, environmental taxes and innovations, paid by agriculture sector from EU countries. In addition to innovation expenditures, we have also checked the level of these expenditures for every single farm.

It is worth mentioning that some of the data on the basis of which the analysis was carried out were estimated in 2009, 2010 and 2012. The year 2013 was adopted as the most current year, because of the majority of statistical data necessary for the analysis concerned this year as the most up-to-date.

3   Results and Discussion

The first stage of the analysis was the presentation of basic figures characterizing agriculture in all EU countries. These values were: the number of farms, their total area, the amount of income earned, the number of employees and the level of production (crops, milk and meat) presented in Table 1

Table 1 **The main volumes of EU agriculture**

Country	Number of farms	Total farms' area (ha)	Standard output (euro)	Labour force directly employed (per person)	Total production of crops, milk and meat (in thonnes)
Romania	3 629 660	14 661 380	11 989 578 640	1 552 630	20 926 360
Poland	1 429 010	16 487 480	21 797 461 420	1 918 550	31 379 860
Italy	1 010 330	15 933 790	43 793 881 650	816 920	22 125 610
Spain	965 000	30 042 210	35 978 946 920	813 550	25 954 280
Greece	709 500	5 062 500	8 103 007 120	463 860	4 670 360
Hungary	491 330	7 048 760	5 577 723 710	433 700	13 632 550
France	472 210	29 264 400	56 914 191 760	724 690	75 214 700
Germany	285 030	18 305 150	46 252 042 690	522 730	57 491 100
Portugal	264 420	4 625 700	4 509 024 200	323 470	1 447 650
Bulgaria	254 410	5 608 980	3 335 670 170	320 230	9 368 190
United Kingdom	183 040	18 663 950	21 818 581 460	274 520	28941060
Lithuania	171 800	3 125 370	1 919 223 290	144 770	4 511 570
Croatia	157 440	1 728 100	2 029 135 280	175 050	3 661 050
Austria	140 430	5 815 840	5 671 213 540	111 160	5 978 050
Ireland	139 600	5 277 990	5 012 538 820	163 690	3 457 890
Latvia	81 800	3 058 780	990 012 640	82 090	1 964 370
Slovenia	72 380	902 160	1 009 230 010	82 450	489 440
Netherlands	67 480	2 008 870	20 498 061 340	153 310	2 202 100
Sweden	67 150	6 424 370	4 678 580 280	59 320	6 349 460
Finland	54 400	5 786 690	3 398 060 700	57 550	4 143 220
Norway	43 270	5 372 090	3 410 100 700	44 000	965 000
Denmark	38 280	2 920 610	9 580 213 710	53 170	9 943 600
Belgium	37 760	1 350 200	8 406 674 190	56 730	4 909 470
Cyprus	35 380	123 810	495 411 360	16 550	140 600
Czech Republic	26 250	5 076 430	4 446 963 820	105 080	8 433 760
Slovakia	23 570	3 067 090	1 812 222 660	50 600	3 421 490
Estonia	19 190	1 229 420	676 317 090	22 060	1 149 360

Country	Number of farms	Total farms' area (ha)	Standard output (euro)	Labour force directly employed (per person)	Total production of crops, milk and meat (in thonnes)
Malta	9 360	11 980	96 790 090	4 450	11 300
Luxembourg	2 080	137 790	313 811 850	3 530	181 250

Source: Authors' own calculations based on Eurostat statistics, http://ec.europa.eu/eurostat/web/agriculture/data/database, access date 25-12-2017.

The yellow fields indicate the first five countries with the highest values for a given category, and the countries are being sorted by the number of farms. As shown in the table above, the first five countries with the largest number of farms are Romania (3,6 mln), Poland (1,4 mln), Italy (1,0 mln), Spain (0,9 mln) and Greece (0,7 mln). For the total area of agricultural land, Spain is on the 1st place, with more than 30 million hectares of agricultural land, on the second is France, with less than 30 million hectares of agricultural land. On further places, the following countries have been found: Poland (16,4 mln ha), Germany (18,3 mln ha) and United Kingdom (18,6 mln ha), in which the area of agriculture land is similar. In the case of revenues generated by farms, France is on 1st place, when in 2013 farms generated a total of more than 56 billion Euros. On the further places are Germany (46 billion Euros), Italy (43 billion Euros), Spain (35 billion Euros) and United Kingdom (21 billion Euros). It is worth to add that, right after the United Kingdom, Poland was located, whose farms in 2013 generated over 21 billion euro revenue. In the case of a number of employees in agriculture, on the first four place are the countries with the largest number of farms: Romania (1,5 mln employees), Poland (1,9 mln employees), Italy (0.8 mln employees) and Spain (0.8 mln employees). Whereas France is in the last place (0.7 million employees). But, in contrast, France is on the 1st place in the case of total production, being an undisputed leader, since French farms in 2013 have produced over 75 million tons of products. Germany, which produced nearly 20 million tons less - 57 million tons of products, is on 2nd place. Poland is on the 3rd place, whose production is less than half of the French farms' production - 31 million tons. The next is Spain, whose production is one third the size of French farms and is hovering around 25 million. Italy ranked fifth with 22 million tons of production. In general, looking at the table above, it is clearly visible that Romania, Poland, Italy, Spain, France, Germany and the United Kingdom are characterized by the largest values. On the

other hand, Greece is on the 5th place in terms of the number of farms, but the remaining values are far from the first five.

In case of agriculture environmental protection expenditure, only Poland, Czech Republic, Romania and Croatia provide this kind of information. In this ranking, Poland is on the first place, with expenditures at the level of over 36 million Euro. The Czech Republic is on the second place, with outlays amounting to over 21 million Euro. The next two places Romania and Croatia occupy, whose expenditure on agriculture environmental protection amounted to 8.2 and 7.2 million Euro, respectively.

Table 2 **Agriculture environmental protection expenditure in EU countries, 2013**

Country	Agriculture environmental protection expenditure in EU countries (mln Euro)
Poland	36,89
Czech Republic	21,73
Romania	8,2
Croatia	7,21

Source: Authors' own calculations based on Eurostat statistics, http://ec.europa. eu/eurostat/web/agriculture/data/database, access date 25-12-2017.

As was mentioned above, for this kind of information, only four countries have provided the data – all of them the above table includes. Having in mind the share of agriculture environmental protection expenditure in a total environmental protection expenditure, the biggest share can be noticed for Croatia, where agriculture environmental protection expenditure accounts for 5,17% of total environmental protection expenditure, on the next place is the Czech Republic with the share of 3%, and then Poland – in which agriculture environmental protection expenditure accounts for 1,96% of total environmental protection expenditure in 2013.

Table 3 **Environmental taxes paid by agriculture in EU countries, 2013**

Country	Environmental taxes paid by agriculture (mln Euro)	Country	Environmental taxes paid by agriculture (per one farm)
Germany	1 228,81	Denmark	6,74
France	1 016,85	Sweden	6,60
United Kingdom	886,57	**Netherlands**	5,88

Country	Environmental taxes paid by agriculture (mln Euro)	Country	Environmental taxes paid by agriculture (per one farm)
Italy	738,82	Czech Republic	5,61
Poland	519,49	United Kingdom	4,84
Sweden	443,28	Germany	4,31
Greece	423,12	Norway	3,69
Netherlands	396,81	Slovakia	2,90
Austria	276,75	Finland	2,17
Denmark	257,98	France	2,15
Spain	243,00	Austria	1,97
Norway	159,86	Luxembourg	1,58
Czech Republic	147,28	Estonia	0,94
Hungary	136,85	Italy	0,73
Finland	118,28	Greece	0,60
Portugal	83,71	Latvia	0,45
Slovakia	68,43	Ireland	0,43
Bulgaria	62,88	Poland	0,36
Ireland	59,46	Malta	0,33
Romania	51,75	Portugal	0,32
Croatia	41,77	Hungary	0,28
Latvia	36,82	Croatia	0,27
Lithuania	24,28	Bulgaria	0,25
Estonia	17,95	Spain	0,25
Luxembourg	3,29	Lithuania	0,14
Malta	3,05	Cyprus	0,07
Cyprus	2,32	Romania	0,01
Slovenia	1,5	Slovenia	0,00

Source: Authors' own calculations based on Eurostat statistics, http://ec.europa. eu/eurostat/web/agriculture/data/database, access date 25-12-2017.

As it can be seen from the above table, Germany is on the first place, in which agriculture paid over 1.2 million Euro in environmental taxes in 2013. France is in the second place, with environmental taxes amounting to over 1.01 million Euro. Such high tax rates are caused by the fact that the areas of agricultural land in both

countries are the highest among the other EU countries, and the agriculture in both countries generates one of the highest revenues as well. On the other hand, comparing the amount of environmental taxes to total revenues, it can be seen that in the case of Germany, these taxes are just 2.66% of total taxes, and in the case of France - 1.79% of the total. In the case of the United Kingdom, in which agriculture paid over 886 million Euro in environmental taxes in 2013, the share of these taxes accounted for 4.06% of the total revenues generated by this sector. But the opposite situation can be observed in the case of Spain, whose total area of agricultural land is over 30 million hectares, but the level of environmental taxes paid amounts to 243 million Euro. Poland is on the fifth place, and according to the table, the amount of environmental taxes paid by agriculture in 2013 amounted to 519.49 million Euros, corresponding to 2.38% in the total income generated by Polish agriculture. On the last place, Slovenia is, where the environmental taxes paid by agriculture in 2013 amounted to just 1.5 million Euro, corresponding to 0.15% of the total income generated by Slovenian agriculture. In turn, looking at the size of environmental taxes from one farm, the highest taxes are paid by Denmark - 6.74 Euro, Sweden - 6.6 Euro, Netherlands - 5.88 Euro and Czech Republic - 5.61 Euro in the year 2013. While Germany, France and the United Kingdom are on the further places. At the same time, it is worth noting that the amount of this tax depends on such situations as introduction of gases into the air, sewage to the ground, water intake or waste storage. So the higher the number of gases, dust, sewage or waste, the higher amount of the environmental tax need to be paid. Thus, can be stated that Denmark, Sweden, Netherlands and the Czech Republic are characterized by their largest sizes.In contrast, countries with the lowest values can be seen as countries in which the agricultural sector generates the least amount of dust, gas, sewage or waste, having a negative impact on the natural environment. In this case, these are Slovenia, Romania, Cyprus and Lithuania.

One of the most important factors determining the level of sustainability is innovation. Innovation in a technology dimension may be a basis for sustainable technologies, which mean "fulfilling people's needs in such a way that the recovery capacity of the planet, as well as the recovery capacity of local ecosystems, are not exceeded. The aim is to bring the worlds' use of natural resources within the boundaries that are set by the earth's recovery capacity. What are the preconditions that the need for sustainable development sets for these innovations" (Mulder, 2007)? Currently, sustainable development is seen as a concept based on three equivalent pillars, and innovation is now treated as a process also affects the environment or social environment (Bajdor, 2017). Therefore, among other things, expenditures on innovations to some extent reflect the innovativeness of

this selected sector. As shown in the figure below, countries such as France, Germany and the Netherlands were in the forefront

Figure 1 **Innovations expenditures by UE countries.**
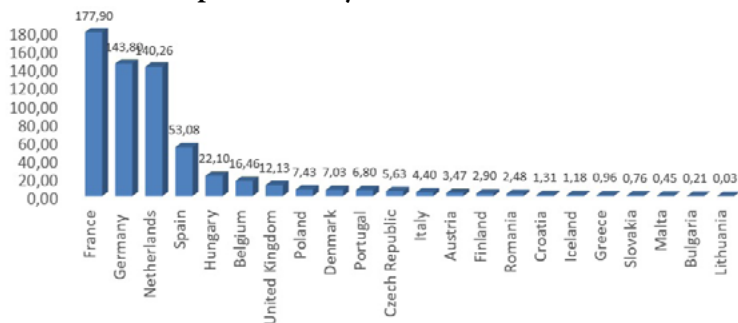
Source: Authors' own calculations.

The largest expenditure on innovations in 2013 was borne by the agricultural sector in France - 177 million Euro, followed by Germany and the Netherlands in the second and third place, where the level of expenditure on innovation incurred by the agricultural sector in 2013 amounted to 143 million Euro and 140 million Euro respectively. The fourth is Spain - the spending on innovation borne by the agricultural sector amounted to 53 million Euro, representing 1/3 of the expenditure of the first three countries. However, taking into account the level of expenditure on innovations incurred by one farm, there are clear differences in the obtained results.

Figure 2 **Innovations expenditures by single farm.**
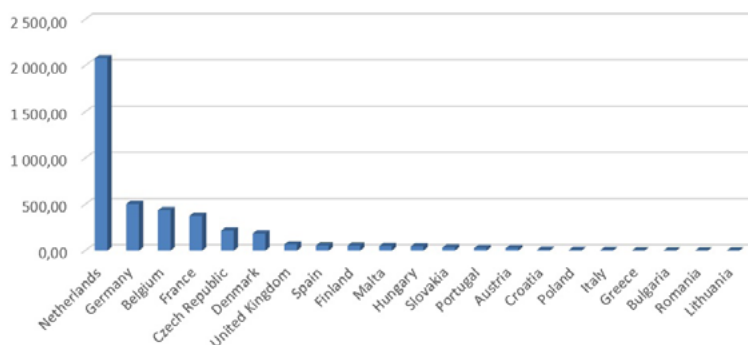
Source: Authors' own calculations.

The Netherlands is in the forefront, where in 2013, one farm has spent over 2,000 Euro on expenditure on innovation. Already, between the first and the second place, there is a clear difference - because the level of spending on innovations incurred by German households was only a ¼ of Dutch expenses - 504 Euros per one farm. A similar level of inputs is characteristic of Belgian and then French farms - 435 Euro and 376 Euro in 2013.

4   Conclusion

Based on the obtained results, it can be assumed that agriculture in Europe Union countries is partly sustainable. In this article, the following Assumption was adopted: besides the main factors determining the level of sustainability in agriculture, other factors such as environmental protection and innovation expenditures with environmental taxes have been checked. Thus, in case of the level of environmental taxes paid by agriculture in EU countries, Germany has the first place, France on the second. In both these countries, the amount of environmental taxes is higher than 1 bln Euro. While, it is worth to mention that the level of environmental taxes depends on the number of gases, ashes, waste generated by the agriculture sector. So, it would seem that agriculture sector in Germany and France generates the highest volume of these pollutants. But checking the level of this taxes paid by single farm – Denmark has the first place, then Sweden and Netherlands. And Germany and France are among the further places. Thus, agriculture in Denmark, Sweden and Netherland generate the highest volume of mentioned pollutants then. And in the last places are Slovenia, Romania, Cyprus and Lithuania – which means that agriculture in these countries generates at least amount of the pollutants. So we can concluded that is operates in more sustainable way.

In case of level of innovation expenditures, France, Germany and Netherlands are in the first place. But, again checking the level of these expenditures paid by single farm – Netherlands are in the first place, then Germany and Belgium. France is in the fourth place. But the high position if the Netherlands in both case, show that agriculture sector is characterized by the high level of innovation expenditures. But in the case of agriculture, environmental protection expenditure – only four countries gave access to their data – Poland, Czech Republic, Romania and Croatia. And it is clearly visible that Poland is in the first place. Thus its agriculture sector has the highest expenditures in order to protect the environment.

To sum up, it can be stated that by examining the level of expenditures on environmental protection, innovation and environmental taxes, Germany, France

and Netherlands have the most sustainable agriculture, on the further places we can put United Kingdom, Spain and the Czech Republic. But in order to draw a full picture, would be worthwhile to check the level and type of waste and greenhouse gas emissions and pollutants generated by each agriculture sector. Which would be the subject of the further analysis in this matter.

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ECOLOGICAL MANAGEMENT IN AGRICULTURE OF UKRAINE AS A PREREQUISITE FOR SUSTAINABLE DEVELOPMENT

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Abstract

Agriculture is one of the priority directions of the Ukrainian economy development due to its strong natural resource potential, presence of fertile soils, traditional ability of the population to work on land, material and technical means, as well as the growing demand for food in Ukraine and in the world. Excessive agricultural development of territories, intensification of production accompanied by an increase in anthropogenic impact on land resources and transformational processes in the agrarian sector have caused negative phenomena in the development of this branch: land degradation, reduction of soil fertility, environmental pollution and decline in land productivity.

However, Ukraine has set a course for sustainable development which involves taking into account economic, social and environmental performance. A prerequisite for sustainable development of agriculture is the formation of an effective system of ecological management at enterprises.

The article gives analysis and prospects of ecological management development in agricultural enterprises of Ukraine as prerequisites of sustainable development.

Keywords: *ecological management, ecological factors, enterprise, market, nature use*

JEL classification: *O13, Q01, Q5*

1   Introduction

A peculiarity of the agricultural sector is the close connection between agrarian production and the environment. Agricultural production takes the necessary natural resources and energy from the environment. The result of the intensification of agricultural activity may be negative consequences, in addition to the growth of production. They can have the form of environmental pollution and inappropriate environmental management which can lead to irreversible changes in the climate on the planet, increase of the level of the world ocean, desertification of large areas, loss of soil fertility, acid rain and degradation of ecosystems. The limited opportunities of the natural environment to provide agricultural production with natural resources and fight against its pollution are the basis for the implementation of sustainable development.

The concept of sustainable development implies that an enterprise achieves its goals only if it takes into account relevant environmental, social and economic consequences of its activities. Sustainable development is a general concept of the modern society proclaiming the need for establishing a balance between satisfying current needs and protecting interests of future generations, including their need for the safe and healthy environment.

The sustainability of agricultural production has different characteristics, such as: soil-climatic, biological and environmental factors; production technology; organization of rural territories; mentality of the rural population. Main deterrent factors for the sustainable development of the agrarian production in Ukraine are deterioration of fertility and soil condition, price disproportions in agricultural industrial production, high level of financial indebtedness of agricultural producers, low level of development of innovative processes, etc.

In order to achieve ecological goals of sustainable development in agriculture, it is necessary to introduce an ecological management system that will develop the environmental policy of enterprises, control processes that can affect the environment and rational use of nature, set goals and observe the progress of their implementation and subordination.

The purpose of this article is the analysis and prospects for the development of environmental management in agricultural enterprises in Ukraine as a prerequisite for sustainable development.

1.1 Analysis of references

Sustainable development is the most important concept of developing countries that operates in developed countries. For the first time, the issue of sustainable

development was voiced in 1992 at the UN Conference on Environment and Development in Rio de Janeiro where representatives of 179 states adopted a program for the economic and social development of mankind in the coming century and formulated it in the document "Agenda for the 21st Century" (1992). The basis of this program was the concept of sustainable development which included "modification of the biosphere and application of human, financial, living and inanimate resources to meet human needs and improve the quality of life" (1992). Since then, the concept of sustainable development has become dominant in most countries of the world.

The most important goals to be achieved as a result of its implementation are:
- Ecological goal is to stop ecological degradation of the environment and eliminate further threats;
- Economic goal is to provide basic human material needs and economic development, using environmentally friendly methods and technologies;
- Social goal is poverty eradication, life and health protection, education and social management (Perkowski, 2002).

However, as noted by Shevchuk V. (2006, 2016), countries of the world in different ways refer to this concept due to different strategic goals and different levels of development. Some countries that aim at survival do not accept this theory. In some countries, the process of admission has already begun and others only just begin. However, environmental problems relate to global problems of mankind which can only be solved by uniting efforts.

Ukraine has not become an exception: a clear national strategy for sustainable development based on the need for the balance between the environment, society and economy is the key to bringing Ukraine closer to world standards of social ecological and economic progress (Gerasymchuk Z.V., 2017). In 2016, Ukraine had national consultations on adapting goals of sustainable development: the experts conducted their ranking using the 5-point system (Kovaliv Y., 2016). Thus, two goals have received ratings of over 4 of seventeen goals listed above. They are contributing to the progressive, comprehensive and sustainable economic growth, full and productive employment and decent work for all (4.27) and poverty alleviation in all its forms and everywhere (4.17).

Above three points experts gave the following goals: development of sustainable infrastructure, promotion of comprehensive and sustainable industrialization and innovation (3.95); promoting a peaceful and open society for the sake of sustainable development, ensuring access to justice for all and creating effective, accountable and participatory institutions at all levels (3.88); ensuring comprehensive and quality education and encouraging lifelong learning opportunities for

all people (3.76); providing access to affordable, reliable, sustainable and modern energy sources for all people (3.74); ensuring transition to rational consumption and production models (3.68); ensuring availability and rational use of water resources and sanitation for all people (3.55); overcoming hunger, achieving food security, improving nutrition and promoting sustainable agriculture (3.50); protection, restoration of land ecosystems and promotion of their sustainable use, rational forest management, fight against desertification, cessation and return of land degradation processes and the process of halting the loss of biodiversity (3.47); ensuring openness, security, viability and environmental sustainability of cities and settlements (3.44); reduction of inequality within and between countries (3.39); strengthening the means of implementation and revitalization of Global Partnership for Sustainable Development (3.20); taking urgent measures to combat climate change and its consequences (3.14), conservation and management of oceans, seas and marine resources for sustainable development (3.07).

The goal of ensuring gender equality, empowerment of all women and girls has received less than three points in Ukraine (2.96). That is, according to the results of national consultations, it can be concluded that in Ukraine, the society is ready to develop in the direction of sustainable development that will ensure economic growth, social justice and rational nature management.

Particular attention is needed to study problems of sustainable development in the agrarian sector of the economy, since main aspects of sustainable development conflict with each other (Pankov O., 2011; Furdychko O., 2011). Thus, the main task of agriculture is food security. Its provision requires implementation of the latest technologies, intensification of production which can result in pollution of the environment and production. The main task of sustainable development in this case is to provide foodstuffs for the population under the condition of preservation and restoration of the natural environment. At the same time, great attention should be paid to the quality of food, as this is one of main factors influencing health of the population (Shramko I., 2016). An environmentally friendly agricultural practice is considered to be less harmful to the environment than the traditional cultivation. At the same time, consumers' desires include both a large number of cheap end-products of agricultural production and absence of effects on human health and the environment, as well as preservation of resources for future generations. As a result, there is a conflict between economic, social and environmental aspects.

Sustainable development of agricultural production is the ability of a business entity to maintain dynamically proportions in organizing activities oriented towards the innovative development; increase social and economic efficiency; increase constantly the pace of development carrying out expanded reproduction

which purpose is to provide the population with quality food products, food security of the state without harm to the environment (Varchenko O., 2012).

According to domestic scientists, sustainable development in agriculture is possible provided the development of environmental management. So, Kocherga M. (2013) notes that necessity and timeliness of implementation of environmental management as an effective tool for agricultural development is conditioned not only by deterioration of the ecological state but also by growing requirements of the management system connected with regular trends in the development of modern production, new trends of scientific and technological progress, increase of production capacities for new technologies and aggravation of the influence of production both on the local and global levels.

Biliavska Y. (2016) observes that the ecological management studies management relations in organizations that ensure its sustainable development, environmental protection, human life safety, rational use of natural resources and environmental safety aimed at the implementation of environmental and environmental impact programs, as well as forms the knowledge of the environmental strategy of the development of society, management of natural resources and nature protection. The main objective of the ecological management is implementation of legislation, control over compliance with environmental safety requirements, ensuring implementation of effective comprehensive measures for the rational use of natural resources and achievement of coherence of actions of state public bodies in the field of environmental protection. The function of ecological management is a type of activity due to necessity of division of labor and specialization in the field of management in order to solve effectively a complex of environmental problems (Dudnikova I., 2014).

The importance of ecological management at enterprises is also spoken by prominent foreign scientists Dankevych Y., Dankevych, Chaikin O. (2016), Allan C., Stankey G.H. (2009) and others. Consequently, the analysis of references on this issue indicates the relevance of the research topic not only in Ukraine but also abroad.

2   Data and Methods

The theoretical and methodological basis of research is modern economic theory, systematic approach to the study of economic and environmental aspects of agricultural development, scientific works of domestic and foreign scientists on sustainable development of agriculture and ecological management.

In the process of research, general scientific and economic methods were used: monographic method; calculation-constructive method; methods of analysis and

synthesis, induction and deduction for the theoretical deepening of representations about environmental factors of agrarian enterprises. In addition, methods used in this work are historical, analytical methods: tabular and graphical (for presentation of calculations and results), comparative analysis, SWOT-analysis, etc.

Materials of State Statistics Committee of Ukraine and personal studies of the authors became the information base of the research.

3   Results and Discussion

Agriculture is one of priority directions of the Ukrainian economy development due to its strong natural resource potential, presence of fertile soils, the traditional ability of the population to work on land, material and technical means, as well as the growing demand for food in Ukraine and in the world. Thus, according to the official data of State Statistics Service of Ukraine, the share of agricultural production in the structure of GDP increased from 8.4% in 2010 to 13.7% in 2016. By the cost of GDP, agriculture occupies the fourth place among all branches of the national economy. More than 17% of the economically active population is involved in agricultural production and the rural population of Ukraine is 59%.

Excessive agricultural development of territories, intensification of production accompanied by an increase in anthropogenic impact on land resources and transformational processes in the agrarian sector caused negative phenomena in the development of this sector: land degradation, soil fertility reduction, environmental pollution and decline in land productivity.

The lack of sustainable land use in Ukraine has led to excessive-exploitation of lands. In Ukraine, about 72% of land resources are utilized with the allowable norm of 60-65% of the total area and cultivation reaches 58% at the tolerable rate of 40%. For comparison, in the developed European countries, this figure does not exceed 32% (Marushevsky, 2006). According to the National Report on the state of the natural environment in Ukraine (2015), in Ukraine, the area of eroded lands is 11.3 million hectares; the total area of wetlands, swamped, waterlogged, saline and acid lands is 13.4 million hectares, including the area of swamps of 1.17 million hectares; underwater and swamped areas is 3.408 million hectares; waterlogged agricultural lands is 320 thousand hectares; saline and solonetzic soils is 4.0 million ha. About 20% of the Ukrainian lands are in unsatisfactory state as a result of oversaturation of soils by toxic compounds,

Table 1 analyzes ecological destructive effects of agriculture on the environment. All activities, carried out as agricultural production, affect soil, water, air and biodiversity.

Table 1 **Ecological destructive impact of the Ukrainian agriculture on the natural environment**

	Soil	Water	Air	Biodiversity
Excessive use of fertilizers and plant protection products	+	+	+	+
Intensive mechanization	+			+
Monoculture farming in plant growing	+		+	+
Incorrect irrigation and reclamation work	+	+		
Violation of production technologies	+	+		
Improper use of waste	+	+	+	
Excessive tillage, reduction of forest cover	+			+
Underdeveloped technical infrastructure	+	+	+	
Lack of information and knowledge about environmental problems	+	+	+	+

Source: Own processing.

The consequence of predatory land use is the tendency to lose humus in the soil. According to Datsko L. (2016), according to the materials of agrochemical certification of agricultural lands conducted by branches of Institute of Soil Conservation of Ukraine, it is determined that every 5 years the Ukrainian soils lose 0.05% of humus on average. In the monetary equivalent of twenty years it amounted to about 450 billion UAH. It is necessary to apply about 8-10 tons of organic fertilizers annually per hectare of sown area to maintain the proper balance of humus in the soil. Every year the soil loses 400-500 kg of organic matter per hectare and, unfortunately, it does not fill up these losses. It is required 100 years to reproduce 1% of humus.

An important component of sustainable agriculture is the transition to a low-carbon production model (Gaiducky I., 2016). Agriculture is a significant source of greenhouse gas emissions. Intensification of the branch and implementation of new technologies contribute to their growth. At the same time, main sources of greenhouse gases are methane (CH_4) and nitrous oxide (N_2O), which, respectively, have 21 and 310 times greater potential for global warming than CO_2

(Norse D., 2011). Figure 1 depicts the structure of pollutant emissions in the context of technological and production processes in agriculture in Ukraine: livestock production requiring extra costs for its utilization is the main industry that causes carbon dioxide emissions.

Figure 1 **Structure of emissions of pollutants in the context of technological and production processes in agriculture of Ukraine, %**
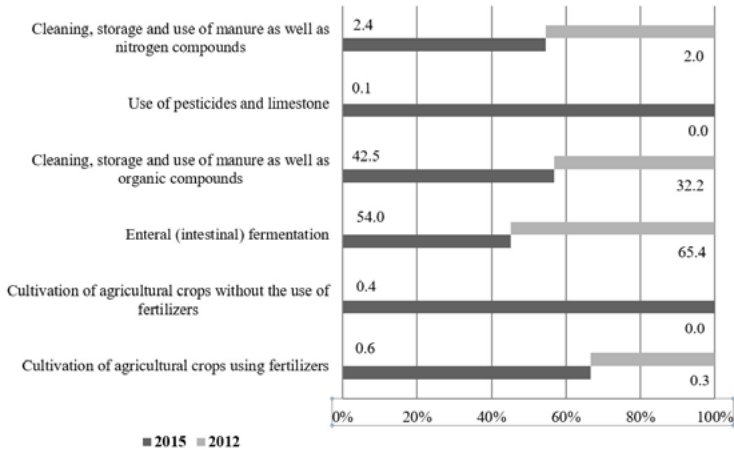
Source: Own processing, based on data http://www.ukrstat.gov.ua.

The above data confirm the thesis of a significant negative impact of the Ukrainian agriculture on the natural environment. To overcome the current situation, according to Prokopenko K (2017), the development of agricultural systems with increased soil protection and moisture-saving qualities, use of resource saving technologies and mechanisms; carrying out measures to preserve the soil fertility, protection from processes of water and wind erosion, salinization, solonization, flooding and other degradation processes; development and implementation of integrated plant protection systems from pests, weeds, frosts, drywall, etc.; development and implementation of energy, water and resource-saving technologies for integrated land reclamation, restoration and expansion of irrigation in accordance with projected climate change, etc. are needed. And this requires the formation of an effective system of ecological management in agricultural enterprises of Ukraine.

It should be noted that in Ukraine the introduction of environmental management in agrarian enterprises is not mandatory. It is arbitrary and is not supported by the state. In economically developed countries, environmental management

is used through the use of international standards ISO 14000 (environmental management systems), ISO 9000 (quality management systems), OHSAS 18001 (occupational safety and health management systems) or through their combination depending on the policy of the enterprise. However, there are also voluntary systems of environmental management which are respected in activities of the enterprise. There is Clean Product Production Program, Net Business Program, Eco-Management and Audit Scheme or EMAS, Product Life Theory and others.

The peculiarity of environmental management is consideration and combination of two contradictions in its activity: providing the enterprise with maximum profit and reducing negative impact on the environment through the rational use of nature and greening production. Environmental management is an integral part of the overall management of the enterprise which includes organizational structure, planning, procedures, processes and resources for implementation and operational management in terms of solving environmental problems. That is, environmental management at the enterprise can be defined as a process of planning, organization, motivation and control which leads to the decrease in the negative impact of the organization on the environment.

Within the framework of environmental management in agricultural enterprises the following activities can be carried out:
- Rational use of natural resources in order to reduce their consumption;
- Reuse of waste;
- Replacement of technologies harmful to the environment on environmentally safe technologies;
- Policy of producing environmentally friendly agricultural products and services;
- Prevention of pollution and harm minimization to the environment;
- Formation of environmental awareness;
- Introduction of pro-environmental education, etc.

Principles of environmental management in agriculture meet ICC principles. The International Chamber of Commerce (ICC) is a non-governmental organization serving world business. Its membership extends to more than 130 countries and includes thousands of business organizations and enterprises with international interests. In response to the World Commission on Environment and Development report, ICC developed a "Business Charter for Sustainable Development" which sets out 16 principles for environmental management (Figure 2).

The Charter covers environmentally relevant aspects of health, safety and product stewardship. Its objective is 'that the widest range of enterprises commit themselves to improving their environmental performance in accordance with

the principles, to having in place management practices to effect such improvement, to measuring their progress, and to reporting this progress as appropriate, internally and externally'.

Figure 2 **16 principles for environmental management**

1. Corporatepriority	16. Compliance and reporting	15. Openness to concerns	14. Contributing to the common effort
2. Integrated management	16 PRINCIPLES FOR ENVIRONMENTAL MANAGEMENT		13. Transfer of technology
3. Process of improvement			12. Emergency preparedness
4. Employee education			11. Contractors and suppliers
5. Prior assessment			10. Precautionary approach
6. Products and services	7. Customer advice	8. Facilities and operations	9. Research

Source: Own processing by ICC site data Business Charter for Sustainable Development, https://www.iisd.org/business/tools/principles.

Environmental management forms basic principles for solving environmental problems at the enterprise. Leszczyńska A. (2011) distinguishes the following activities for environmental management:

- Determining impact on the environment in separate production processes, as well as analysis of the possibility of their processing;
- Development of an environmental program that describes goals and activities of the enterprise on environmental aspects in the medium term;
- Improvement of operational control over the needs of the environment;
- Taking measures to prevent accidents and minimize their consequences;
- Saving material and energy balances to minimize energy and material consumption;
- Monitoring the influence of produced products on the environment;
- Adhering to the principle of Best Available Techniques in planning of new investments;
- Continuous improvement of employee qualifications and environmental awareness.

Stages and sequence of implementation of measures for the establishment of the environmental management system in Ukraine depend on the degree of maturity

of the legislative-normative and organizational-economic base, as well as the level of development of the ecological outlook of the society. Existing practice outside Ukraine shows that the development of ecological management in its formation passes 3 stages:

1. Implementation of the local tactics of "extinguishing fires" that is, the company's management mentions environment only in the case of emergency situations that threaten serious economic consequences.
2. Development of the environmental monitoring system at the enterprise in order to comply with generally accepted environmental norms and rules.
3. Development of a general corporate strategy with defining values of environmental factors. At the same time, the company seeks to achieve it at the expense of the advantage over competitors, mainly by exceeding environmental standards and norms.

Based on the above-mentioned strategies, environmental management in Ukraine is only at the first stage of its formation but the output of agriculture from the crisis and further development of enterprises, respectively, will have a positive impact on the development of the environmental management system. Today, the determining factor of the formation and development of the current system of environmental management in Ukraine is the formation of legislative and normative foundations of the balanced environmental policy of the state. All environmental aspects should be included in the overall planning and decision-making process to develop an effective environmental management strategy at the enterprise. Therefore, before the formation of a corporate and functional environmental strategy it is expedient to conduct an analysis of the influence of internal (strengths and weaknesses of the enterprise) and external (political, economic, social and technological) strategic factors. Among various methods of analysis, SWOT analysis is a systematic study and assessment of the potential that an enterprise has to implement its environmental mission and achieve objectives of the given mission (Andreeva, N., Martyniuk, O., 2013). Table 2 presents the results of SWOT analysis of ecologization processes and formation of the environmental policy at agricultural enterprises in Ukraine.

Table 2 **SWOT analysis of ecologization processes in agricultural enterprises of Ukraine**

Strengths	Weaknesses
Food and environmental security of the country; Powerful human capital assets; Favorable climatic conditions for agrarian production; Application of international standards; Presence of environmental policy; Environmental products and technologies; Prestige of the "green image"; Readiness of producers to certain restrictions; Control of resource consumption.	Excessive plowing up; Environmental pollution; Inappropriate use of natural resources; Low productivity of production; Presence of the "image of the polluter"; Development and modification of the environmental management program; Document management of the environmental management system; Evaluating the effectiveness of the environmental management system; Environmental reports and management control.
Opportunities	Threats
Access to new markets (including international ones); Production of environmentally friendly products; Advancement of the latest technologies; Formation of "the green image"; Environmental innovations and investments; Interaction between consumers and suppliers; Environmental audit; Improvement of the ecological state of the environment; Improving public health.	Need for investment due to the strengthening of environmental standards; Environmental activities of competitors; Impossibility of using some technologies; Outflow of skilled workers; Increase in production costs; Rising prices for manufactured products; Changes in legislation; Possibilities of profit reduction in the initial stages.

Source: Own processing.

Thus, the analysis shows that there are significant opportunities for ecologization of agricultural production in Ukraine through the development of the environmental management system. It will promote the development of agriculture on the basis of sustainable development.

4   Conclusions

In today's economic environment, the issue of implementing environmental management in agricultural enterprises in Ukraine is extremely relevant, a requirement of time and a prerequisite for the transition to the concept of

sustainable development. The ill-conceived intensification of agricultural production in Ukraine has led to significant negative environmental impacts on the natural environment. They include excessive plowing of agricultural lands, their degradation and pollution; pollution of water resources and atmosphere; accumulation of waste, etc.

A prerequisite for overcoming environmental problems in agriculture is the development and efficient functioning of the environmental management system. It is a set of measures that include management of resources, production processes and products aimed at reducing negative effects of agricultural production on the environment and increasing the ecological and economic efficiency of its activities.

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RENEWABLE ENERGY MARKET IN V4 COUNTRIES

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Abstract

Renewable sources of energy are an important alternative when we talk about shifting from fossil based economy toward low-carbon economy. In accordance with one of the most important goals of European Union (EU) to reach 20 percent share of renewable energy in the total energy mix by 2020, countries are oriented to change structure of energy market. Hoverer, it seems that this goal is little too ambitious from viewpoint of some member states. It is quite obvious that countries of Visegrad area will not achieve 20% share of renewables. The main aim of article is to examine the structure of energy market in Visegrad countries (V4) with special focus on production and consumption of renewable energy sources. Consequently, we analyze energy balance of Slovakia, Czech Republic, Hungary and Poland from the side of consumption. We also study the consumption of energy in relation to individual sectors of national economy.

Results of analysis suggest that Slovakia has highest dependence on import of energy from all Visegrad countries. Even though, agriculture and forestry are sectors which are less important in terms of GDP, they are one of the major consumers of energy in Slovakia. We stress the controversy of this fact, because these are the sectors with huge potential for production of biomass as the feedstock of renewable source of energy.

Keywords: *energy balance, renewable energy sources, consumption, V4 countries*

JEL classification: *Q02, Q42, Q57*

1   Introduction

The EU faces globally perceived climate issues resulting into dependence on energy imports and scarce energy resources. The need to mitigate climate change is seen

as the way to fight economic challenges (Directive 2012/27/EU). Therefore, the EU seeks to shift from carbon based industries toward green solutions in development of national economies. One of the most important goals of EU is to reach 20 percent share of renewable energy in the total energy mix by 2020, so the countries are oriented to change structure of energy market (Svetlanská et al., 2015). Suitable climatic, soil and rainfall conditions for growing energy crops in European fields mean that EU has been a key player for biodiesel production, especially Germany (Kapusta & Lajdová, 2016). On the other hand, the issue of biomass production for replacement of fossil fuels is questionable as, especially the first generation biofuels produced from agricultural feedstock, may result in significant problems related to indirect land use change, emissions and food security threat (Frank, 2015).

The goal of energy efficiency improves the security of supply by reducing primary energy consumption and decreasing energy imports. The purpose of investing into renewable energy sources helps to reduce greenhouse gas emissions in an effective way (Directive 2012/27/EU). The renewable energy contribution is expected to increase up to 55%–75% of gross final energy consumption in 2050. It is obvious that the EU has made significant progress since 2005 and is on track to reach its 2020 renewable energy targets (Scarlat et al., 2015)

The cooperation of the Visegrad Group in the energy sector is an extremely important part of their economic policy and a natural component of foreign activities. Regional cooperation in the energy sector is a priority in the context of recent developments that affect the energy security in Central Europe (Visegrad group Annual report, 2016/2017).

The aim of article is to examine the structure of energy market in V4 countries with special emphasis on production and consumption of renewable energy sources. We develop the analytical modelling tool evaluating selected aspects of energy balance of V4 countries with special attention put on renewable energy sources.

Renewable sources of energy in V4 countries

Primary energy consumption includes heating, cooling, and transportation. Increasing renewable energy sources in transportation is more costly than in case of electricity generation, and thus the share of renewable energy sources in electricity generation is likely to be significantly high, even higher than 20% in 2020 (Ruska & Kiviluoma, 2011).

In case of V4 countries, a balanced approach was shaped under the presidency of the Slovak Republic in 2015, in order to achieve EU energy policy objectives. The focus was put on topics like safety, competitiveness and sustainability, preserving the sovereignty of the countries in the choice of energy mix in accordance with national conditions and in the choice of technologies for low carbon energy

system, the need to develop an analysis of the impact on energy prices and costs for industry and households, as well as measures to protect vulnerable customers. In this context, it has been emphasized that in line with the principle of subsidiarity and technological neutrality, nuclear energy is essential from the perspective of emission reduction (Dynamic Visegrad 2014/2015).

The Czech Republic

The Czech Republic has experienced strong growth in the sector of renewable energy, with the share of renewable energy sources (RES) in total primary energy supply increasing from 6.7% in 2010 to 9.4% in 2014 despite claims that the potential of RES is limited by natural conditions and environmental protection requirements. The State Energy Policy projects up to 25% renewable energy in total energy consumption by 2040. Reaching the envisaged share of RES will require greater focus on developing the sector and examining the potential of all RES (IEA, 2016).

Hungary

Hungary has ambitions to fulfill EU Commission requirements by ensuring 14.65 % ratio of renewables within its gross final energy consumption by 2020, over the obligatory 13 % prescribed for Hungary as national overall target in the Renewable Energy Directive (Gullai, 2016). The ratio of the RES out of the gross final energy consumption was 9.6 % in 2014.

Poland

Production of primary energy in Poland is based mainly on fossil fuels. First place belongs, to hard coal and lignite, which cover 56% of the demand. Crude oil also has a significant share amounting to 25% (PAIH, 2013). The power of all installation producing energy from the renewable energy sources was sixfold from above 1 GW in 2004 to over 6 GW in 2015. This growth is seen as the result of increase in power of wind farms. In 2015, wind farms dominated the renewable energy production sector by 64 % of the total power from renewable energy sources (Igliński et al., 2016).

The Slovak Republic

Due to its extraordinary technical potential, the current use of RES under the conditions of the Slovak Republic is inadequate. Less than 12% of technical potential for biomass is currently used as well as the potential solar energy (0.2%). As the result of the construction of large hydropower plants, the hydro power potential is used for 50%. The Slovak Republic is rich in geothermal resources compared to other V4 countries. It currently uses approximately 36 localities in Slovakia for production of geothermal energy. The lowest technical potential for use in the Slovak Republic has the wind energy (IRENA, 2017).

2   Data and methodology

For analysis of renewable energy market in V4 countries we developed analytical model to examine selected progress indicators of RES (Renewable Energy Sources).

Figure 1 **Analytical model**
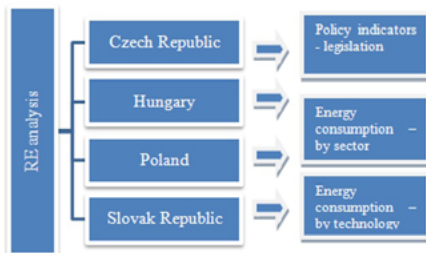
Source: elaborated by authors

Notes: RE – renewable energy

For the policy indicators we examine the common legislation of EU in terms of fulfilling national targets set by Renewable Energy Directive.

Data on energy consumption are based on the Energy balances of V4 countries and are obtained from statistical offices, International Renewable Energy Agency (IRENA) and EUROSTAT.

3   Results

The table below (Table 1) shows data from the Statistical Office of the Slovak Republic. These data represent the percentage of consumption of energy from renewable energy sources in total energy consumption in the Visegrad Group countries and national targets set by Renewable Energy Directive for the period 2010 – 2015.

Table 1 **The development of the share of energy consumption from renewable energy sources in total energy consumption in the Visegrad Group countries and national targets set by Renewable Energy Directive for the period 2010 – 2015**

	Slovak Republic	Czech Republic	Hungary	Poland
2010	09.1	10.5	12.8	09.3
2011	10.3	11.0	14.0	10.3
2012	10.4	12.8	15.5	10.9
2013	10.1	13.8	16.2	11.4

	Slovak Republic	Czech Republic	Hungary	Poland
2014	11.7	15.1	14.6	11.5
2015	12.9	15.1	14.5	11.8
target 2020	14.0	13.0	13.0	15.0

Source: Statistical Office of the Slovak Republic, own processing.

The member states of the European Union have adopted targets for the use of energy from renewable energy sources – 20 percentage share of renewable energy consumption by 2020 and 27 percentage share by 2030. Each of the European Union member states, besides the targets above, also sets its own target. Visegrad Group countries aren´t exceptions. Their targets are listed in the table (Table 1). The total share of energy consumption from renewable energy sources rises in the each country of the Visegrad Group from year to year, which is a positive signal for implement the energy policy priorities and the ideas of green growth. In 2015 (which will be the subject of a more detailed analysis) the Czech Republic and Hungary didn´t only to achieve, but also exceeded the certain target. The Slovak Republic - target of 14 percent and Poland - target of 15 percent of the use of renewable energy, have failed to reach the target until the last analysed year. The highest percentage share of energy from renewable energy sources (15.1 percent) was achieved in the Czech Republic in 2015. Based on available data we can state, that the Slovak Republic missed only 1 percent of the national renewable energy target in 2017.

The situation regarding the share of energy from renewable energy sources for the period 2010 - 2015 is illustrated by a bar chart.

Figure 2 **The development of the share of energy consumption from renewable energy sources in total energy consumption in the Visegrad Group countries and national targets set by Renewable Energy Directive for the period 2010 – 2015**
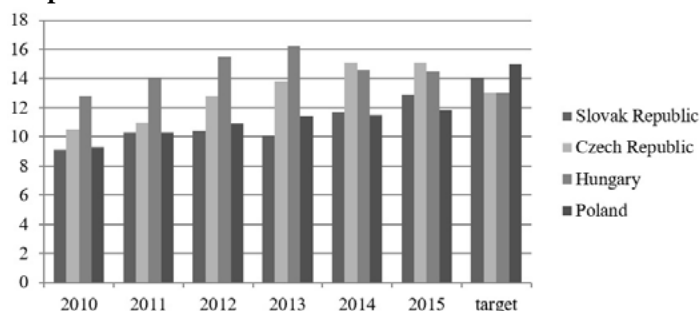
Source: Statistical Office of the Slovak Republic, own processing.

The percentage of renewable energy consumption in total energy consumption in individual countries of the Visegrad Group in 2015 will be the subject of a more detailed analysis.

Slovak Republic

In the Slovak Republic, the consumption of energy from renewable energy sources in total energy consumption in 2015 is 52 396 TJ (12.9 percent). The largest share of renewable energy consumption in the Slovak Republic represents energy produced from solid biomass (blockwoods, wood chips, briquettes, pallets, sawdust, straw and hay). Causes of 50.5 percent of solid biomass share of all available technologies are general availability, huge resources and low energy costs. On the other hand, the lowest share of renewable energy consumption represents wind energy due to a political decision about institutional blockade of the construction of wind power plants since 2010.

Figure 3 **Percentage of energy consumption from renewable energy sources in the Slovak Republic in 2015 - technologies**
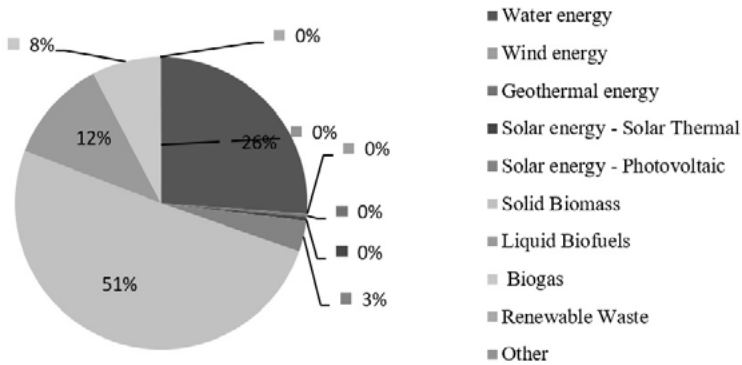
Source: International Renewable Energy Agency, own processing.

Czech Republic

In the Czech Republic, the consumption of energy from renewable sources represents 15.1 percentage share (165 938 TJ) in 2015. Compared to the Slovak Republic, the consumption of renewable energy in the Czech Republic is more than tree times higher. The largest share of renewable energy consumption in the Czech Republic has energy consumption, that is produced from solid biomass. The wide use of biomass in this country is the cheapest way to increase the share of renewable energy sources in energy production. On the other hand, wind energy has the lowest share of renewable energy consumption. Wind energy belongs

to the technology from which the Czech Republic produces less energy, because the construction of wind power plants is limited due to technical and environmental constraints.

Figure 4 **Percentage of energy consumption from renewable energy sources in the Czech Republic in 2015 - technologies**
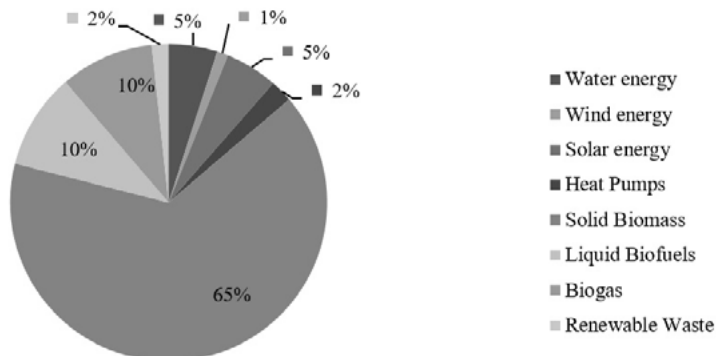
Source: International Renewable Energy Agency, own processing.

Hungary

In the Hungary, the consumption of energy from renewable energy sources represents 108 031 TJ (14.5 percent). Analogous to the Slovak and Czech Republic, there is the most energy from renewable energy sources made of solid biomass. Consumption of solid biomass represents 84.1 percentage of the total energy consumption of renewable energy sources. Boilers, which is designed for burn biomass should replace coal-based system in the Hungary. The lowest share of renewable energy consumption represents solar energy. We can say, that in 2015 the contribution of the Sun to energy production is minimal. Solar energy (which is dedicated to the production of electricity – photovoltaic cells and heat - solar collectors) represents less than 1 percent of the consumption of energy from renewable energy sources.

Figure 5 **Percentage of energy consumption from renewable energy sources in the Hungary in 2015 - technologies**
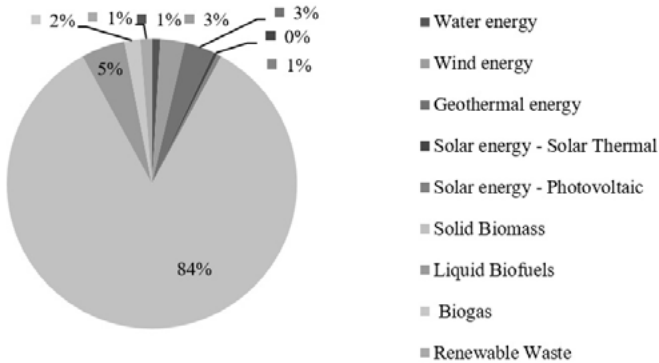
Source: International Renewable Energy Agency, own processing.

Poland

In the Poland, the consumption of energy from renewable energy sources represents 302 500 TJ (11.8 percent). Consumption of bioenergy produced from solid biomass (223 225 TJ) represents 73.8 percent of total renewable energy consumption. Based on the above, we can say, that four analysed countries of the Visegrad Group consume the most energy, which is produced from the solid biomass. Liquid biofuels and wind energy are also significant. On the other hand, the lowest share in the consumption of renewable energy sources represents geothermal energy.

Figure 6 **Percentage of energy consumption from renewable energy sources in the Poland in 2015 - technologies**
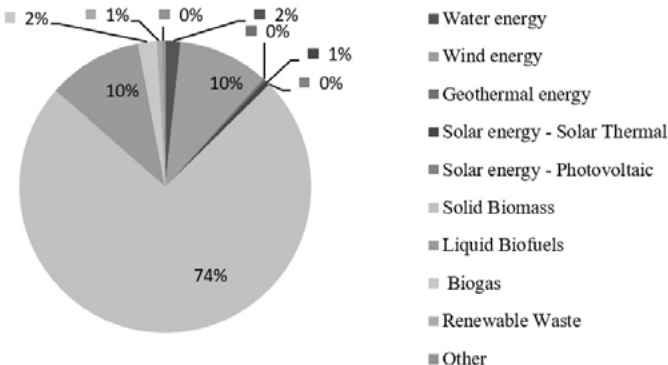
Source: International Renewable Energy Agency, own processing.

The following table (Table 2) shows the data on the share of energy from renewable energy sources in three selected sectors.

Table 2 **Percentage of energy from renewable energy sources in three selected sectors in 2010 - 2015 in the Slovak republic**

	renewable energy sources			
	electricity	transport	heating and cooling	total share
2010	17,8	5,3	7,9	9,1
2011	19,3	5,5	9,3	10,3
2012	20,1	5,4	8,8	10,4
2013	20,8	6,0	7,9	10,1
2014	22,9	7,6	8,9	11,7
2015	22,7	8,5	10,8	12,9

Source: Statistical Office of the Slovak Republic, own processing

Based on the data from the table we can say, that the share of renewable energy represents three sectors in which the countries of the Visegrad Group (in our case the Slovak Republic) were obliged to set their targets. The largest share of energy from renewable sources in the conditions of the Slovak Republic concerns the production of electricity and the smallest transport sector during the whole analysed period. The Czech Republic, Poland and Hungary reach the highest values in the heat and cold sector.

4 Conclusion

The Visegrad Group represents an informal cooperation of four Central European countries (Slovak Republic, Czech Republic, Hungary and Poland). Visegrad Group is a lively and informal regional structure of four European Union and NATO member states which share the same values and have a common history, culture and geography. The member states of the Visegrad Group have adopted targets for the use of energy from renewable energy sources – 20 percentage share of renewable energy consumption by 2020 and 27 percentage share by 2030. The Czech Republic and Hungary didn´t only achieve, but also exceeded the predetermined target. The Slovak Republic - target of 14 percent and Poland - target of 15 percent of the use of renewable energy, have failed to reach the target until the last analysed year. The largest share of renewable energy consumption in the Slovak Republic, the Czech Republic, Hungary and Poland represents energy produced from solid biomass. On the other hand, the lowest share of renewable energy

consumption in the Slovak Republic and the Czech Republic represents wind energy, in Hungary solar energy and in Poland geothermal energy. The largest share of energy from renewable sources in the conditions of the Slovak Republic concerned the production of electricity and the smallest transport sector during the whole analysed period. The Czech Republic, Poland and Hungary reach the highest values in the heat and cold sector.

Acknowledgment

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TRANSFORMATIONS OF WORK OF A RURAL POPULATION IN THE CONDITIONS OF MODERNIZATION OF ECONOMY

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Abstract

In article results of a research of modern conditions of development of process of modernization in rural territories, influence of this process on economic and social situation of a rural population are considered.

The main part of empirical material is taken from statistical data on the Republic of Tatarstan during 2007-2016. On the basis of the made expected and analytical calculations two negative tendencies are revealed: decrease in need for manpower in rural territories and, as a result, deterioration in economic and social situation of villagers. From there is a problem of providing a priority of the purposes of nation-wide social and labor policy over the economic interests of the separate enterprises, including at the level of rural territories which decision seems in development of a number of the specific programs directed to elimination of negative consequences of development of modernization and reflecting the general social strategy of transformation of work. Research objective was to reveal the peculiarities of development of rural territories in the conditions of economy modernization.On the basis of system approach the complex analysis of the main tendencies characteristic of the current state of rural territories of the Republic of Tatarstan is carried out. Application of statistical methods allowed establishing trends of the processes happening in rural territories. At the same time conditions of the Republic of Tatarstan are typicalfor agrarian regions.

Keywords: *agro food market, modernization, rural economy, rural territory, work*

JEL classification: *J21,Q10, R23*

1   Introduction

At realization of strategy of sustainable development of rural territories of the Russian Federation until 2030 in the conditions of modernization of economy of the agrarian sector there is a number of the serious and complex problems connected with implementation within this strategy of necessary transformations in the most important sphere of activity of a rural population – in work.

Research objective was to reveal the peculiarities of development of rural territories in the conditions of economy modernization. The formulated purpose assumes solutions of the following tasks:

- to investigate current trends of development of rural territories;
- to investigate influence of the revealed tendencies on economic and social situation of villagers.

Strengthening of the competition in the agro food market demands rational and effective use of resources of the agrarian sector of economy, strengthening of material interest of the managing agricultural formations in decrease in costs of production, in rational use of the saved-up potential, including in reduction of the attracted manpower and expenses of live work (Fayzrakhmanov, D.I., Valiyev, A.R., Nezhmetdinova, F.T., & Hamidullin, N.N., 2012). Orientation of agricultural formations to the mode of comprehensive economy affected social shape of work – on its contents, conditions, intensity, i.e. on those parameters which are important from the point of view of realization, reproduction and development of abilities of the person to work and other individual properties of the personality (Nezhmetdinova, F.T., 2015).

Thus, resource-saving became one of the solving and directing factors of social transformations in the sphere of work. At the same time, it was necessary to direct these transformations and other concrete ways of intensive conducting production activity to change of social and labor provision of a rural population as labor resource of agrarian production. Intensive economic growth has to be embodied not only in growth of level of results of production of goods, but also in progressive change of forms of economic and social situation of a rural population (Gazetdinov, M.Kh., Semicheva, O.S., & Gazetdinov, Sh.M., 2017).

In this regard the task of the choice of the priority directions of development of production activity in rural territories, definitions of a condition of successful modernization transformations is set.

Well-known, the uniform, conventional concept "modernizations" it is not developed yet. Studying of researches of modernization transformations in the countries with the developed market economy allows to generalize what complex updating of the society which lagged behind in social and economic development

and its transition to modern society with more high-tech economy understand as modernization (Belykh, V.S., 2011). In particular, in researches of foreign and domestic experts the following main directions of modernization of economy of rural territories are allocated:

- intermunicipal cooperation, including rural and city partnership (Garcilazo, E., 2014);
- introduction of resource-saving technologies, development of small and average business, cooperation and integration, formation of infrastructure of the food market in the agrarian sector of economy (Gazetdinov, Sh.M., 2013);
- realization of intangible assets of rural territories, etc. (Zhirnel, E.V., 2010).

Modernization, with other things being equal, has to act as means of the complex and accelerated social progress what strict control of the sequence of realization of various social interests is necessary for (Gazetdinov, M.Kh., & Habirov, R.S., 2016).

Told above about social orientation of intensive economic growth it is connected with such features of economic development in the conditions of market economy which root in the property relations inherent in it. Their specifics are not directed to the solution of social problems of rural territories therefore bodies of Territorial Department should find and develop mechanisms, to subordinate ways and results of managing to the radical interests of a rural population – to the interests of improvement and alignment of social and economic conditions of activity for free development of the identity of each inhabitant of rural territories. In relation to the sphere of work it means need of systematic ensuring constant, with other things being equal, growth and alignment of opportunities for realization, reproduction and development of abilities of the villager in the course of work (Nezhmetdinova, F.T., 2007). It is unfair to consider the industry and the cities as Lokomotiv of all economy, and to assign to rural territories a part of the supplier of rather cheap raw materials for the industry, food and labor. Therefore without integrated approach to development of rural territories economic growth will be slowed down or will lead to emergence of difficult disproportions in economy, to further distribution of poverty, inequality and unemployment (Sustainab, 2004). Rural territories have to find the way, leaning mainly on the local enterprises, developing along with the agrarian sector small and average business, especially nonagricultural direction. In general the idea of complex territorial development is not new (Grundlagen, 2000; Nezhmetdinova, F.T., 2015). It arose when rural regions began to overcome structural deficiencies not so much due to external investments, how many due to creation of the integrated agricultural formations.

In the Republic of Tatarstan process of formation of market economy painfully affected economic and social situation of a rural population. The agrarian

sector owing to specifics peculiar to it more difficult and more slowly adapts to the changed managing conditions (Nezhmetdinova, F.T., 2013).

n the conditions of market economy the low competitiveness of the majority of agricultural formations was shown. In general, they were forced to reduce production therefore the number of the workers occupied in them decreased, unemployment, including hidden grew. Compensation level in the agrarian sector remained at a low level, work wages in kind partly practice (Semicheva, O.S., Gilfanov, R.M., & Gazetdinov, Sh.M., 2015).

At the same time at the present stage of development of economy it is impossible to characterize unambiguously development of rural territories together with the level of development of agricultural industry (Gazetdinov, M.Kh., & Zakirov, R.M., 2012). Rural territories have the specifics which are connected with traditions, culture and rather low density of population. The specifics are shown also that the rural economy can be at the same time presented rural and forestry, industrial production, tourism and a recreation, other branches (Rural, 2017). These activities can become supplementing to the main specialization of business in the concrete rural territory.

Rural territories are some kind of open systems, it assumes objective impact on processes of their development of conditions of various nature, in this regard the resource capacity of the rural zone should be considered in dialectic unity of factors and conditions of production (Gazetdinov, M.Kh., Semicheva, O.S., & Gazetdinov, Sh.M., 2016). They can be characterized, in particular, by the direction, frequency and depth of changes, probability of approach of these or those situations. Degree of adaptability of rural territories to these changes, therefore, both efficiency of production activity of subjects of business and economic and social situation of the population depends on degree of accuracy of forecasts of the happening processes.

As proceeding from the predicted changes, resources which make a part of resource capacity of rural territories are allocated and collect, and define, eventually, ability of system to adapt to changes and operating conditions.

In this regard, the information on probability of approach of this or that situation is fuller, the resource capacity of rural territories is used more effectively. Therefore, it is necessary to reveal what resources at this stage of development of economy are limiting and what processes have negative tendencies.

2   Data and Methods

The reforming of the agrarian sector of economy continuing from 90th years in the Republic of Tatarstan led to profound changes in rural territories. On the basis

of agricultural enterprises subjects of business of various form of managing and property were formed, large agroholdings are created, peasant farms, etc. were formed. All these transformations and the held events for development of the agrarian sector of economy in the republic promoted increase in production in agricultural industry.

On the basis of system approach the complex analysis of the main tendencies characteristic of the current state of rural territories of the Republic of Tatarstan is carried out. Application of statistical methods allowed to establish trends of the processes happening in rural territories. At the same time conditions of the Republic of Tatarstan are typical for agrarian regions.

The gross output of agricultural industry in the comparable prices grew almost twice, in 1999 made 1143,4 million rubles and in 2016 – 2200,8 million rubles. However all this did not lead to considerable improvement of economic and social situation in rural territories. As a result only in the last decade the average annual number of employees of agricultural organizations (y1) was reduced from 99,1 thousand persons in 2007 to 56,4 thousand people in 2016 or for 43%. The tendency is described by the following equation:

$$y1 = 102,06 - 4,79\ t,\ R2 = 0,995, \tag{1}$$

where   t – the period, years.

Reduction of average annual number of employees of agricultural organizations is followed by a steady tendency of reduction of number of a resident rural population (y2) from 954,3 thousand people in 2007 (25,4% of total number) up to 912,6 thousand people (23,6%). This process is described by the following equation:

$$y2 = 959,63 - 5,02\ t,\ R2 = 0,985 \tag{2}$$

These negative tendencies create a dissonance in such parameters as power equipment and installed power per employee in agrarian production. So, the indicator of power power of agricultural organizations (y3) for the studied period of 2007-2016 tends to decrease from 4989 to 3964,9 thousand hp, described by the equation:

$$y3 = 4884,47 - 115,78\ t,\ R2 = 0,932 \tag{3}$$

At the same time power equipment parameter on 100 hectares of acreage (y4) decreases from 200 hp to 169 hp, and the parameter of installed power per employee of one employee of agricultural organizations (y5) increases from 52,6 hp to 73,7 hp. These tendencies are described by the equations:

$$y4 = 203,13 - 3,86\ t,\ R2 = 0,890, \tag{4}$$

$$y5=47,127 + 2,49 \text{ t, R2}=0,966 \tag{5}$$

From our point of view the last dependence biassedly characterizes the processes happening in the rural zone.

Along with reduction of level of security of agricultural industry with a manpower there were also other considerable changes in rural territories. Fixed assets of agricultural industry (y6) increased by 88%, from 43348 million rubles in 2007 to 81512 million rubles in 2016. The tendency is described by the equation:

$$y6=43772,07 + 4185,41 \text{ t, R2}=0,939 \tag{6}$$

The share of number of the unemployed living in the rural zone in the total number of the unemployed decreased from 23 to 16,7%.

The average monthly charged wage in agricultural industry grew from 4918,3 rub. in 2007 to 17234,6 rub. in 2016. At the same time this level of the salary remains low in comparison with other branches. In 2007 the ratio with national average level made 42,9%, by 2016 it increased to 57,0%.

The tendencies described above connected with main types of resources in rural territories objectively demonstrate existence of disproportions in economy in general and also between the city and rural zone.

For the studied period decrease in investments into fixed capital of agricultural industry is observed that creates a lack of financial means for reproduction of both separate resources, and social and economic conditions in rural territories. All this also objectively caused reduction of a manpower and decrease in rates of development of rural territories. The maximum volume of investment of 26826,7 million rubles was recorded in 2007, minimum – 8882,7 million rubles in 2014. In this case agricultural formations perform "city-forming" functions of rural territories.

3   Results and Discussion

Thus, on the basis of the made expected and analytical calculations we can draw a conclusion that two features of development of rural territories in the short term are distinguished. On the one hand, due to effective use of the last achievements of scientific and technical progress and improvement of engineering procedures in modern agricultural formations the need for a manpower (Figure 1) decreases. On the other hand, rural territories in the Republic of Tatarstan represent a peculiar system in the sense that more than 92% of all rural settlements were and remain agrarian on the status and the main functions. Therefore, decrease in demand for a manpower from agricultural industry leads to deterioration in economic and social situation in them, and, as a result, to outflow of the population

from the rural zone. It is confirmed by growth rates and a ratio of the average monthly salary of workers of agricultural industry and size of a subsistence minimum on average per capita in a month across the Republic of Tatarstan.

The analysis of researches of foreign experts confirms existence of the similar problems existing in agricultural industry and in local economy of EU countries. As one of them the lack of local jobs in rural districts is distinguished (RITTER, K., 2010; EC. 2012a; EC. 2012b; FEKETE, G. Ë., 2006; EUROSTAT. 2014A; EUROSTAT. 2014B).

Reasons of an economic benefit can induce, of course, agricultural enterprises to such technical and organizational solutions which are equitable to the developed interests of these or those categories of workers. So, so far became obvious that in increase in labor activity of workers, reduction of turnover of staff, increase in labor productivity, overcoming scarcity of labor a role of the major means is played by a requirements satisfaction of the modern worker in simplification and improvement of working conditions, in increase in its pithiness, available real opportunities for growth of qualification, professional advance. Therefore on the agenda as relevant tasks reduction of jobs of hard manual labor, work with unhealthy conditions moves forward.

Figure 1 **Dynamics of social and economic processes in the Republic of Tatarstan in 2007-2016.**
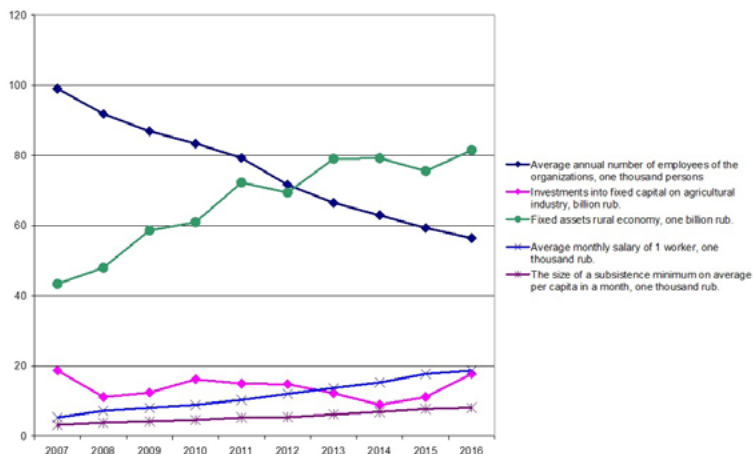
Source: Gazetdinov, M.Kh., Semicheva, O.S., & Gazetdinov, Sh.M. (2017). Social and labor aspects of an economic mechanism of development of rural territories. *Machinery and equipment for the village,10*, 36-39.

Need of the systematic solution of these tasks is realized fully today, and an adequate way of their decision implementation of target programs in the social and economic sphere fairly is considered. One of such programs is the developed nowadays republican target comprehensive program "Modernization of agrarian and industrial complex of RT" which priority directions are:

- increase in labor productivity due to equipping by the multipurpose equipped appliances;
- increase in competitiveness of production;
- introduction of energy saving technologies;
- complex mechanization of family farms, etc.

It should be noted, however, that served as the main impulse for strengthening of systematic, purposeful replacement from production of unattractive types of work and still requirements of production activity for overcoming deficiency of the offer of certain types of work serve. This situation is lawful for any agricultural formation – whether it be large agro holding, agricultural production cooperative or peasant farm. For them change of social shape of work is a factor of increase in economic efficiency of the functioning. Economically target approach to transformation of work does improvement of its social characteristics only by the investigation of production decisions irrespective of when the social effect is reached – along with economic or to it irrespective of the fact how the relevant activities are carried out – incidentally, under pressure of force production majeure or as the thought-over, far-sighted, systematic, but he production of narrow profile strategy of concrete economic entity(Ziganshin B.G., G.S.Klychova, A.R. Zakirova, G.R. Valieva, A.S.Klychova. 2017).

The described situation inevitably leads to such phenomena which slow down, complicate process of transformation of work on the bases completely adequate to market economy. First, for realization of local economic interests of economic entities there is quite sufficient an orientation to the developed needs of workers. At the same time the change of these requirements, growth of inquiries of villagers corresponding to objective social orientation of development of society act often as the factor counteracting realization of economic interests. In any case, if process of change of social nature of work is not put under strict control from society, then it is impossible to hope that development of material and technical resources of production and its organization will deliver the necessary bases for transformation of work into the most urgent vital need of all members of society. Secondly, that not less important, at economic focus of improvement of jobs social results of scientific and technical decisions on transition to more productive technology, economic decisions on use of the workers "exempted" from less productive or unattractive work, etc. only accidentally can also partially coincide with public

concerns from among those that make the specific system of immediate tasks of rural territories in the field of improvement and alignment of economic and social situation of workers of agricultural industry. Quite real discrepancy of social consequences of modernization of production, on the one hand, and the public purposes in the field of work, with another – will demand further development of special programs for elimination of negative consequences of development of technology, technology and the organization, allocation on it additional resources.

Well-known, the principle "what is favorable to the enterprise has to be favorable to the worker" expresses need and a possibility of coordination of collective and economic interests. This formula "does not work" when it is required to provide a priority of the purposes of nation-wide social and labor policy over economic interests at any level of the enterprise, including at the level of rural territories. The priority of socio-political interests is reached not on bases of economic advantage, and on bases of economic discipline and comprehensive responsibility for its observance.

4   Conclusions

Thus, the conducted researches of experience of the Republic of Tatarstan on modernization of economy of rural territories allowed revealing features of transformations of work in these conditions that defines need of development of the special social and target block for any comprehensive programs of modernization. At the same time all programs what there were initial incentive motives to their emergence have to be united by the general social strategy of transformation of work. Purpose of the block — to set such social requirements to the decisions affecting this sphere which, limiting freedom of economic entities in use of factors of increase in economic efficiency of production, would provide at the same time quite certain character and the sequence of social changes in work.

It is revealed that development of the social sphere of rural territories depends on a level of employment of their inhabitants therefore employment has to be full. Development of small and average business does not solve this problem, diversification of local economy is necessary.

It is established that the efficiency of development of fixed assets of agricultural industry and investments also directly depends on security with manpower. Low level of investment attractiveness of the enterprises of agricultural industry and rural territories also is connected with it, in turn, that leads to deterioration in social and economic conditions of development of territories in general.

Now decisions on development of a number of specific programs in the sphere of work are made and are carried out, in particular in the Republic of Tatarstan the target comprehensive program mentioned above "Modernization of agrarian and industrial complex of RT" is carried out.

Acknowledgements

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IMPLEMENTING THE IDEA OF SUSTAINABLE DEVELOPMENT IN THE DAIRY ENTERPRISES IN POLAND

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Abstract

The conception of sustainable development is a relevant element of the country policy and in order to realize it, the whole society must be involved, including the processing industry which interferes in the natural environment through using its' resources and emission of pollution. One of the branches of the agro-food sector in Poland realizing the demand of that conception is the dairy industry. The aim of the elaboration is presentation of the activities realized in the dairy industries in the range of sustainable development. The first part describes the assumptions of that conception and implementing those assumptions in reference to the production firms. In the second part, based on the analysis of the results of the empirical studies, implementing the basic activities in the dairy industries were described, taking into consideration such elements like water and sewage management, waste management and protection of the atmospheric air. The basic tool for empirical research was a questionnaire. The surveys were carried out in 76 Polish dairy enterprises in Poland, including 20 small, 40 medium and 16 large ones, from over 200 ones performing in the time. The majority of the Polish dairy enterprises implements the pro-environmental activities, which are consistent with the conception of sustainable development. Beside the environmental aspect which concerns protection of the basic environmental components, those activities also realize the economic aspect, because their effect is saving the raw materials, the energy and the material used in the production process, which in turn translates to financial savings.

Keywords: *dairy enterprises, pro-environmental activities, sustainable development*

JEL classification: *D24, L23, L53, L66*

1   Introduction

The beginning of the conception of sustainable development was the year 1987, when UN Commission on Environment and Development, called after the name of the chairwoman the Brundtland Commission, published a report 'Our common future'. It was a turning point in the approach to the natural resources management and to the protection of the natural environment. The Commission analyzed the main tendencies resulting from contraction of natural resources and economic development and presented the rules of the new approach to the development policy.

Implementing rules of sustainable development is influenced by behavior of all business entities, however, taking into consideration large exploitation of natural resources by enterprises and generating dangerous pollution, it is the approach of those organizations which is essential for efficiency of implementing the conception. It should be expected that the sustainable development of an enterprise should undergo merger of the environmental and economic and social aims and should competently coordinate the firm's activities in those three areas (Witek-Crabb, 2001).

The production enterprises base their activities on the access to the natural resources, without which it would be not possible to conduct the entire production cycle. Therefore, they use the natural resources like water, air, fossil fuels. Simultaneously, during the production process, pollution of natural components is generated. The proper management of natural resources ensures their less consumption, which amongst the overriding ecological effect, translates to lower financial costs.

The aim of the elaboration is presenting main assumptions of the conception of durable and sustainable development and on that basis showing the activities carried out in the dairy enterprises whose role is to implement the environmental aspect of that conception. In the research the examples of natural resources management in the dairy industry which result from the empirical studies carried out by the author are presented. Selection of the dairy industry is caused by great importance amongst all the industries of the agro-food sector and by large influence of the production process on the environment's condition. The dairy industries, which often use the natural resources inefficiently, simultaneously produce pollution of all environmental components. It is particularly connected with using the raw materials in order to receive energy. It is significantly adverse, taking into consideration their exhaustion and emission of harmful gases which are generated during burning of those materials.

The dairy industry is one of the basic sectors of the Polish agri-food sector, which, among other things, is due to the fact that milk is one of the main, ranked among the most universal and complete taking into consideration the nutritional values of the food products [Kapusta, 2012]. In addition, in the sales structure of the Polish food sector in 2012 the dairy products constituted   14,8% [Polska Agencja Informacji I Inwestycji Zagranicznych, 2013].

Polish dairy industry undeniably benefited from joining the European Union. In less than 10 years this branch multiplied the foreign trade balance three times. The modernization of the processing tools of the dairy enterprises thanks to Common Agricultural Policy, influx of the foreign investors and arriving of large distribution deeply changed the range of Polish dairy products [Wieczork-iewicz, 2013].

In the last years Polish dairy enterprises, especially in the technological part, went through profound modernization. Particularly rapid development took place before and soon after joining Poland to the European Union. Thanks to those investments, Polish dairy industry is one of the most modern branches of economy in Poland. 10 years after joining Poland into EU structures the investments in the dairy industry were based mainly on introducing new products and new solutions. Technologies for the dairy industry have been developing in three directions: increasing the effectiveness, lowering the production costs and environmental compatibility of the products [Rymanowski, 2012].

1.1   The assumptions of conception of sustainable development with detailed reference to the enterprises

The increasing amount of people on the Earth is connected with the need for bigger production, larger natural resources' usage, larger pollution's emission. Therefore, it is an unfavorable aspect for the natural environment which translates to the social problems. In order to counteract those problems, the economic growth paradigm has been replaced by the durable and sustainable development paradigm.

The 'Environmental protection law' from 2001 provides that 'Sustainable development – is such a development in which in order to balance the development opportunities of particular societies or its' citizens – both the current and the future generations – the political, economic and social activities are integrated, with maintaining the environmental balance and the durability of the basic environmental processes'. From this definition it follows that the economic and civilization growth of the current generation should not take place at the expanse of natural resources exhaustion and damaging the natural environment, for the sake of future generations which also will have rights to their own development.

(Urbaniec, 2001). It would mean a combination of the economic growth with special care for intactness of natural resources, which for some authors seem not to be possible to implement in reality (Mitlin, 1992).

Straight from the definition of sustainable development result three main features, which are sustainability, durability and self-holding. The conception of sustainable development, assuming a dialogue for decades between the citizens of the same country and between different countries, emphasizes the necessity to satisfy people's needs without belittlement of future generations' chances (Ionescu, 2011).

In order to implement the paradigm of durable and sustainable development efficiently, the 'invisible hand of the market' is not enough. There is a necessity to use the state intervention, e. g. in the form of institutional conditions or legal solutions. The argument for using the state interventionism in case of sustainable development is, among others, occurrence of negative external effects connected with economic and municipal activity of a human being with lack of cost internalization of those effects. It results in increased, from environmental protection point of view, production of particular goods, higher contamination of production, too low prices of the products polluting the environment, lack of economic factors to implement technical and technological changes aiming environmentally friendly production and lack of the incentives to promote recycling (Pieńkowski, 2011).

Ensuring implementation of rules of conception of sustainable development demands balancing simultaneously both the production and the consumption. The producers should use as little as possible the non-renewable resources and using the non-renewable resources should occur in a way enabling their recirculation, not allowing their dispersion in the form of waste. The enterprises should invest in new technologies which would allow to minimize the harmful influence of the production process on the natural environment. On the other hand, the sustainable consumption should be related with its' limiting and it should be based on more aware and deliberate action. The ecologically aware consumer is a subject who buys only the amount of goods which is absolutely necessary. Therefore, he plans his purchases trying to take into consideration amongst various other factors those connected with the necessity to protect the natural environment (Hadryjańska, 2015, p. 48).

The Brundtland Report allowed to spread the conception of sustainable development and make people realize that healthy economy depends on good environment, thus there is a necessity to implement the environmental policy into the general economic policy. It also strongly emphasized the fact that the eco-development means integration of the economics and ecology, taking into

consideration the strategy of a long-term development (Pessoa, Rui Silva 2009, Söderbaum, 2011).

The aims of sustainable development simultaneously constitute the aims of the ecological policy of the state whose assumptions appear in Article 5 of the Constitution of Republic of Poland, indicating that 'Republic of Poland is guided by the rule of sustainable development, meaning striving for: maintaining the possibility to renew the natural resources, rational using of the resources, limiting the onerousness for environment and not crossing the limits designated by its' resistance, maintaining its' biological diversity(…)'.

Creating the conception of sustainable development enabled a closer look at the discussion and difficult topics, such as distribution of wealth, equality, extreme poverty, helping the poorest countries, maximizing the profits at all costs, access to the basic goods constituting the existence of man, the quality of natural environment, environmental threats and internalization of the environmental costs. The assumptions of the conception seem to be basically good and the difficulties in their realization cannot deter and cause their rejection, because so far there is no better solution (Schrecker, 1996). However, it is also relevant that implementing the rules of sustainable development took place on all levels of social-economy system's functioning, starting from individual business entity, through particular industrial branches, ending with the macro-economic scale.

The enterprise is a relevant link in realization of the investment programs of the state's ecological policy and it is in the center of interest of the activities on behalf of environment's protection. Presently the implemented Ecological Policy of the State determines the essence of reconstruction of the production and consumption model towards reducing the pressure on the environment through suitable shaping of the pro-ecological patterns. For the enterprise entering into the mutual interdependencies with the natural environment it is beneficial to elaborate internal environmental policy consistent with ecological policy of the country, whose basics are connected with realization of the rule of sustainable development.

The production enterprises often perceive the activities connected with environment protection as a ballast which causes additional costs but is indispensable for legislative reasons. They are relatively rarely convinced by the arguments, even such that the proper approach to the natural resources economy may improve their competitiveness. Surely, the reason of that state is still inadequate ecological awareness of the managerial staff and other workers, but also limited financial resources of the organization. The knowledge about what may be done in order to increase the environmental parameters and to use natural resources more

efficiently in the production industries is also loo little (Łuczka-Bakuła, 2010), (Kudłak, 2010).

In 2000 the RP government adopted the 'Long-term strategy for durable and sustainable development – Poland 2025'. The document clarifies the aims of the policy in the range of all three basic pillars of sustainable development: social, economic and environmental. The overriding aim of this strategy is to provide Polish families increase in well-being, strengthening their material self-reliance and sense of security. The document determines inter alia the rules and methods of horizontal activities which refer to the enterprises. Amongst others, they are:

- consistent realization of the rule of liquidation of pollutions at source, m. al. changing the energy carriers, dissemination of cleaner technologies, minimizing of the energy and resources' usage, common normalization of emission in the industry, energetics and transport, introducing the product standards limiting the pollution emission to the environment in full cycle of product consumption;
- inclusion of the environmental costs to the economic calculation, especially in reference to the energy- and material-consuming production processes and wares and such transport forms which cause significant decrease of the environment's quality;
- development and implementing new economic instruments of environment management, including the common ecological insurances, the allowance markets and the ecological fees for the households and small family businesses;
- creating consistent and stable law-financial system compatible with the rule 'the polluter pays', providing effective financing the environment's protection;
- implementing solutions directed at providing ecological safety, including the biological and chemical ones, in the form of notification procedures or licensing of the production activities, trade, development of the rescue plans and notification of the people;
- diversifying of the energy sources towards ecologically demanded direction, including increase in the energy production from renewable resources;
- enlargement of the range of the environment impact assessment system and introducing strategic procedures for the assessment of impact on the environment;
- realization of the research programs aiming increasing the effectiveness of using the natural resources in the production processes, especially development of alternative fuels' technologies enabling replacing the petrochemical fuels based on carbohydrates;

- development of the mechanism of collecting data, controlling the environment condition and compliance with emission standards and implementing the monitoring and statistical systems to the processes and phenomenon not covered by the system data collection;
- common implementing the certification system of the enterprises.

2   Data and methods

The aim of the research was to identify pro-environmental activities implemented in dairy enterprises that contribute to raising the level of sustainable development in the country. The basic research tool was a questionnaire composed of three parts. One of them concerned activities undertaken by dairy enterprises related to water and sewage management. The second part of the survey included questions about waste management, and the third part - questions related to the protection of atmospheric air.

A mail questionnaire was used for the research, and a personal interview was selected as a supporting and complementary method by means of telephone or direct conversation. The use of this form of information collection was necessary in cases where the respondents were unable to properly answer the questionnaire or when the questionnaire was partially completed by the respondents. In addition, telephone contact was also made at the stage of collecting the address data in order to supplement the data obtained from the Central Statistical Office.

The basic tool for the questionnaire survey was a questionnaire which, through a proper and thoroughly thought out structure, affected the achievement of the research objectives. The questionnaire allowed to obtain accurate information from respondents and to determine the structure of the survey as a form of research. It also enabled the unification of the storage system of collected data and improved the processing of data. The questionnaire was structured with the explicit purpose of the research. The questions contained in it were of closed nature and were presented to the respondents in exactly the same way as to the content and form.

After the questionnaire was completed, pilot studies were carried out in 10 enterprises to obtain information that would enable the basic research to be carried out correctly. The purpose of the pilot study was to obtain qualitative information. Pilot studies made it possible to check the developed research tool and revealed respondents' responses to individual questions in the questionnaire. The collected data allowed to describe the way of understanding the questions or revealing the feelings and emotions caused by individual questions. It was also necessary to test the prepared questionnaire in terms of completeness of the anticipated responses.

The questions have been checked in terms of their suitability for achieving the objectives of the study.

Some questions should have been answered yes-no, and some of the answers were assigned an order scale, in order to assess the significance of a given factor.

The survey data received has been processed in Excel. The number of enterprises has been assigned the appropriate response rate.

3 Results and Discussions

The empirical research was conducted using the questionnaire given in 2015 to the 76 Polish dairy enterprises, including 20 small, 40 medium and 16 large ones, from over 200 functioning at the time. The smallest firms, employing up to 9 workers were deliberately omitted. It was assumed that those firms run such a small production that taking care of environment protection's issues does not constitute fundamentally the frame of their activity. The object of the study were the pro-environmental activities in the dairy enterprises, taking into consideration water and sewage management, waste management and atmospheric air protection.

It was stated that over 80% of enterprises introduce the activities from the range of resources management, and only 5,5% of the dairy industries do not intend to introduce such activities, even in the distant future. The main reason for such situation are the financial considerations and low ecological awareness of the management staff. The beginning of especially intensified pro-environmental activities occurred after 2000.

Because the majority of the researched enterprises run active environment protection in their range, recognition of motivation of such activity is interesting (Tab. 1). In order to describe the reasons of taking pro-environmental activities the interviewers graduated them from the least important, through the moderately important, ending with the most significant. Over 70% of enterprises are involved in the environment's protection in order to adjust to the legal provisions. For over half of the enterprises the growth of the effectiveness and decreasing of the production costs as a result of pro-environmental policy were important, and for over 30% - the possibility to improve their image and maintaining their position on the market and meeting consumers' requirements. Simultaneously, over half of the respondents defined the firm's image improvement as insignificant reason for taking pro-environmental activities (such distribution is caused by the possibility to mark more than one answer by the respondents).

Table 1 **The reasons for taking actions from the range of natural resources management in the dairy enterprises**

Reason for undertaking proenvironmental activities	the most important		moderately important		minor important	
	Number of enterprises	Percentage of enterprises	Number of enterprises	Percentage of enterprises	Number of enterprises	Percentage of enterprises
requirement to adapt to legal regulations	57	75	9	11,8	10	13,2
meeting requirements and expectations of consumers	31	40,8	10	13,2	45	46
maintaining the market share	27	35,5	32	42,1	17	22,4
improvement of company's image	26	34,2	19	25	31	40,8
increase in efficiency	40	52,6	7	9,2	29	38,2
reduction of production costs	39	51,3	20	26,3	17	22,4
improvement of company's competitive edge	18	23,6	22	28,9	36	47,5
general trend in the sector	15	19,7	22	28,9	39	51,4

Source: Own study.

The studied enterprises determined the priorities concerning the resources management aiming protection of the main environment components (Tab. 2). Due to the character of the run production activity the most relevant in the dairy industry (for over 90% respondents) is to reduce the load of the wastewater pollution. For over 80% of the enterprises it is very significant to reduce the amount of waste and to limit the thermal and electric energy usage. Over 60% of the research enterprises determined that the prior activity in their enterprise is to increase the ecological awareness of the workers and to increase the production's automatization level.

Table 2 **The prior activities concerning resources management in the dairy enterprises**

Prior proenvironmental activities	Number of enterprises	Percentage of enterprises
Raising the environmental awareness of employees	49	64,5
Increased degree of automatization	52	68,4
Installation of filters reducing emissions to the atmosphere	27	35,5
Less use of raw materials for the production process	40	52,6
Reducing the amount of waste	66	86,8
Reduction of sewage pollutants load	70	92,1
Reduction of amount of heat and electricity	62	81,6

Source: Own study.

In the dairy industries the water resources are especially intensively used because they are demanded on various production stages of almost all products' sorts. The dairy branch uses about 27,6% of water (according to the data from 2010) compared to the whole food sector. Moreover, large amounts of wastewater of big pollution load, variable pH, with high content of general suspensions, nitrogen, phosphorus, proteins and fats are produced.

The dairy industries, in order to improve the water and sewage management, introduce technical-organization solutions which allow to save the water resources and to decrease the amount of wastewater created during the production circle. According to the research carried out in 2003 and 2015 in the dairy industries throughout the country it was possible to describe such activities and also to observe the changes which relatively took place in that period.

Over 70% of analyzed industries indicated that in 2015, in order to decrease the amount of water which leaked in an unchecked way, use full control of the armature, valves, taps and gaskets (Table 3). In 2003 slightly over half of the industries used such solution for improving the water and sewage management. Over 60% of the researched enterprises in 2015 used the washing hoses with pistol grips, efficient pipe connections and the measuring devices controlling the water usage. 12 years earlier there were much fewer of such firms. About 68% of the dairy enterprises in 2015 carried out a strict control of the milk leakage and also

properly organized the washing and cleaning of the devices, meaning immediately after finished process with water at the suitable temperature etc. In 2003 only 46% of the enterprises used such solutions.

Table 3 **The ways of limiting the water usage and producing the wastewater in the dairy enterpries in 2015 and 2003**

Ways to reduce water consumption	2015		2003	
	Number of enterprises	Percentage of enterprises	Number of enterprises	Percentage of enterprises
Using pistol handle hoses for washing				
The full control of fittings, valves, taps and gaskets and their regulation and exchanging on new	54	71	41	53,9
Propely conducted washing machines	51	67,1	35	46
Applying welded connectors of pipes	53	69.7	44	57,9
Strict control of milk leakage	51	67,1	34	44,7
Applying measuring instruments and steering of level of liquid	47	61,8	23	30,3

Source: Own study.

The undesirable effect in the process of dairy products' production are the wastes which must be suitably managed. In the dairy industries the main groups of waste are the organic post-process waste, used packaging and the sewage sludge, meaning the leavings after wastewater treatment.

The main way of waste management in the dairy industry in 2015 was minimizing its' amount and recycling (about 80% of the enterprises indicated that they use such method) (Table 4). Over half of the dairy enterprises in that time deposited the waste in a landfill and used it for fodder. In 2003 the modifications of the technologies were also basic way to limit the produced waste (about 50% of units used such method), however, over 70% of the respondents declared using the waste for the fodder.

Table 4 **The ways of waste management in the dairy enterprises in 2015 and 2003**

Method to minimize waste levels	2015		2003	
	Number of enterprises	Percentage of enterprises	Number of enterprises	Percentage of enterprises
Deposit on landfills	40	52,6	44	57
Minimizing quantities eg through technological and product modifications	66	86,8	36	47,4
Destination on animal feed	46	60,5	50	65,8
Recycling	58	76,3	39	51,3

Source: Own study.

Implementing the pro-environmental activities in the dairy enterprises also concerns protecting the atmospheric air. In the dairy enterprises the most significant point source of the pollution emission to the atmosphere constituting a threat for the environment are the boiler rooms. In the dairy industry still the most common are the coal-fired heating boilers, however, they start to be gradually replaced by the gas or oil furnaces. The relevant source of emission in the dairy industry are the coolers which are often based on ammonia. The ammonia emissions have the form of uncontrolled escapes and they are also connected with venting systems.

In the name of the atmosphere protection the dairy enterprises (over 70% of those organizations) used in 2015 mainly the low-calorie fuels and they limited the dust by using the cyclone filters. About half of the enterprises constantly maintained the potential fugitive emission sources (e.g. from compressor gasket, orifices, valves etc.), used modern combustion technologies and passed to the gas heating. In 2003 almost all of the enterprises passed to the gas heating and used the capture systems (hoods, shielding systems) in order to limit the point emissions. Over half of the enterprises in that time constantly maintained the potential sources of the fugitive emissions, limited the dust by using the cyclone filters, used modern combustion technologies.

4   Conclusion

The idea of sustainable development constitutes a basis of the country's and European Union's policy. In implementing its' assumptions, so that their influence can be observable in the real economic, environmental and social effects, all of the subjects must participate, especially the production enterprises. The dairy enterprises can be classified to such subjects.

The majority of the Polish enterprises implement the pro-environmental activities which are consistent with the conception of sustainable development. Beside the environmental aspect which also concerns protection of the basic environmental components, those activities also realize the economic aspect because their effect are saving the resources, energy and materials used in the production process which translates to the financial savings. It was confirmed by the respondents' answers to the question about the main reason for introducing such activities. It turned out that the dairy enterprises are guided mainly by the legislative provisions, but also by the growth of the effectiveness and lowering the production costs.

Due to the character of the production activity the most significant in the dairy industry is to reduce the wastewater pollution load. Furthermore, it is extremely relevant to suitably manage waste and to reduce the heat and electric energy used in the production process.

The author, comparing the period directly preceding joining Poland to the EU with the beginning of the second decade of the XXI century, was able to observe the changes taking place in the dairy industries' approach to the environment's protection. Before joining Poland to the European Union (in 2003) the dairy enterprises used fewer ways to improve the water-sewage management and the waste management. However, the technological solutions whose aim was to protect the air from gas and dust pollutions were already implemented in 2003.

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EXAMINING THE DEPENDENCE OF EXPENDITURES ON WAGE AND POVERTY RATES IN REGIONS OF THE SLOVAK REPUBLIC

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Abstract

Paper investigates existence of economic and social disparities in the Slovak Republic caused by regional disparities. The subject of survey are households' expenditures and factors affecting them. The regions of Slovakia are understood as municipalities and are investigated during analyzed period of 2005-2015. The concept of research is concerning with review of scientific articles describing development of households' expenditures as well as with practical conclusions and scientific results. Paper reveals differences between Slovakia's regions in expenditures responses to changes in poverty rates and nominal gross monthly wage. Regression and correlation analysis was applied. Expenditure deviations are explained separately in each region by independent variables changes. The results of analysis confirmed the dependence of expenditures on the poverty risk rate and the nominal gross monthly wage. Results represents quantification of changes in region's expenditures for the single unit change of the independent model variables. Research also shown in which regions are expenditures influenced the strongest and in which the weakest by selected factors.

Keywords: *net cash expenditures, nominal wage, households,regions, poverty rate*

JEL classification: *D1, D12, D31*

1   Introduction

The explanation for isolated monitoring of individual regions of Slovakia and further comparison results from the different development of these areas, mainly due to the specific climatic conditions, the disposing of natural resources, resulting character of territory settlement and, last but not least, different industrial processes. Differences formed in this way have caused diverse conditions in the individual territorial areas of Slovakia to form the quality of inhabitants' life. Resulting effect are different level of wages, expenses, or poverty.

According to Holková et al., 2003, wages, salaries and other compensations are possible forms of rewards for the production factor - labor. Nominal wage represents the amount of money that was assigned to the employee for his labor and effort. Reducing this amount by the purchasing power of money changes creates a real wage corresponding to the volume of goods employee can buy for his nominal wage. Thus, real wage determines employee's consumption and also allows comparison of living standards from a period and regional point of view.

When examining differentiation of household spending patterns in EU countries for the era of the years 1995-2011 found out Dudek – Koszela – Krawiec, 2013 that category in the expenditure on alcoholic beverages, tobacco and narcotics, expenditure on health there is neither convergence, nor divergence. Categories clothing and footwear and communication showed divergence, which means that there are significantly different expenditures in these categories in the EU countries. For other categories, such as food and non-alcoholic beverages, transport, education, housing, recreation and culture, furniture is confirmed that differences in households' expenditure on mentioned categories between the EU member states diminish.

A study by Michálek - Podolák, 2016 points to emphasis the socio-spatial dimension of poverty in Slovakia. Most of the districts with a high level of poverty lie in the east of the countryside, with the most western regions of Zlaté Moravce and Žarnovica. The districts with the lowest synthetic indicator of poverty came from Bratislava I and Bratislava II districts and contrariwise region with the highest indicator is Kežmarok.

Comparison of food and non-alcoholic beverages consumption of the Slovakian population has been considering by Nagyová-Stávková-Kádeková 2013. After the EU membership changes in household income and wealth were reflected in final consumption and food expenditures. The first income quartile of households spent 609.9 Euro per person per year on the food and non-alcoholic beverages in the period 2004-2011, while the fourth income quartile spent 1013.53 Euro per person per year. The lowest income quartile had the lowest consumption of meat

and meat products (44.03 kg per person per year), price elasticity has shown that if the meat price increases by 1%, demand will fall by 0.275 kg. They are characterized by both price and revenue inelasticity. By contrast, households in the fourth income quartile show price elasticity.

2 Data and Methodology

In order to explain changes in net cash expenditures throughout analysed period, methodology of regression and correlation analysis is applied. The power model is used to describe the dependency. The general form of the model is:

$$x_2^{b_2} \; y = a * x_1^{b_1} * \tag{1}$$

where: y is dependent variable - net cash expenditure (NCE)

a is constant

b_1, b_2 are regression coefficients

x_1 is independent variable – nominal gross monthly wage of the employee (NGMWE)

x_2 is independent variable – risk of poverty rate (RPR)

Modified form is as follows:

$$NCE = a * NGMWE^{b_1} * RPR^{b_2} \tag{2}$$

The following form of equation after the necessary logarithm transformation can be written:

$$lnNCE = lna + b_1 lnNGMWE + b_2 lnRPR$$

Analysed period presents years 2005-2015 and data were obtained from regional database of the Statistical Office of the Slovak Republic.

The MS Excel is applied, output from regression consists of correlation analysis, model verification and regression analysis.

3 Results and discussion

The amount of money that households allocate as their expenditures is influenced by many factors. In addition to the qualitative ones represented in particular by the attitudes, the quantitative factors determining the amount of resources generating income of the household budget are more relevant. Due to the fact that there should be dependency between household expenditures and household incomes, we have decided through a regression and correlation analysis confirm the

tightness between net cash expenditure (NCE = y) and nominal gross monthly wage of employees (NGMWE = x_1) and risk of poverty rate (RPR = x_2) in each self-governing region individually. Following tables show the most important data from power regression models, as they presented the most significant results.

3.1 Correlation analysis

Estimated coefficients defining the dependence of studied variables and the share of explained variability of the dependent variable are represented in table 1.

Table 1 **Correlation coefficient, coefficient of determination and adjusted coefficient of determination**

	BA	TT	TN	NR	ZA	BB	PO	KE
Multiple R	0,8982	0,9599	0,9072	0,9236	0,9165	0,8711	0,8663	0,9575
R Square	0,8067	0,9214	0,8231	0,8531	0,8399	0,7589	0,7505	0,9168
Adjusted R Square	0,7583	0,9018	0,7788	0,8163	0,7999	0,6986	0,6881	0,8960

Source: Own processing.

The correlation coefficient representing correlation between analyzed variables reveals that in each of the regions is a strong dependence of net monetary expenditures on the nominal gross monthly wage and the risk of poverty. The strongest dependence was observed in the Trnava (TT) and Košice (KE) regions and the weakest in the Prešov (PO), Banská Bystrica (BB) and Bratislava (BA) regions.

The adjusted R-squared compares the descriptive power of regression models that include diverse numbers of predictors and it takes into account the number of observations. Based on this coefficient, we quantify the percentage variability of the dependent variable explained by the model. In the Trnava (TT) region selected model explained variability the most, 90.18% of net cash expenditures changes in the time series. In Košice (KE) it was less than 90% and the lowest adjusted R-squared was recorded by the Prešov (PO) and Banská Bystrica (BB), where model was not able to explain even the 70% variation of net cash expenditure.

3.2 Verification of the model

In our research we examined the dependence of net monetary expenditures on the nominal gross monthly wage and the risk of poverty. We used the F test and formulated following hypotheses:

H0: *The chosen model is not suitable for describing the dependence of net cash expenditure on the nominal gross monthly wage and the risk of poverty.*

H1: *The chosen model is suitable for describing the dependence of net cash expenditure on the nominal gross monthly wage and the risk of poverty.*

The F test results are the same for each analysed region as we examined the same time series period.

Table 2 **F test values**

	95%	99%							
F value	4.46	8.65							
	BA	TT	TN	NR	ZA	BB	PO	KE
F value	16.69	46.89	18.61	23.22	20.99	12.59	12.03	44.10

Source: own processing

Based on the F test values, an alternative hypothesis H1 is confirmed and we rejected zero hypotheses H0. We confirm that the model is suitable for describing the dependence of net cash expenditures on gross monthly wages and the risk of poverty. The selected model and independent variables explain changes of dependent variable with 99% reliability for each analysed region. The highest calculated F values are in Trnava (TT) and Košice (KE), where the reliability of the model is the highest.

3.3 Regression analysis

The T test verify the hypothesis H0: *the selected regression coefficient is insignificant, equal to zero*. The alternative H1 hypothesis states that the regression coefficient is different from zero and statistically significant. The T test values are the same for each analysed region as we examined he same time series period.

Table 3 **T test values**

	95%	99%							
T value	2.23	3.17							
		BA	TT	TN	NR	ZA	BB	PO	KE

T value	ln NGMWE	5.73	9.11	4.67	6.67	6.37	2.33	4.64	8.26
	ln RPR	-0.43	-1.46	-0.77	-2.51	-1.63	-0.04	-1.42	-6.14

Source: own processing

Based on the calculated T statistics it can be said that the regression coefficient for the nominal gross monthly wage of the employee is significant at significance level of 0.01 for all regions except Banská Bystrica (BB). In this region was the significance of parameter validated only for the level of 0.05. Thus, the alternative hypothesis of the nominal gross monthly wage parameter significance was confirmed in each region. With 99% confidence net monetary expenditures will change when the nominal gross monthly wage changes. The independent variable risk of poverty has become significant only in the Nitra (NR) and Košice (KE) regions, at a significance level of 0.05 for Nitra and 0.01 for the Košice region. In other regions alternative hypothesis H1 was rejected. Thus, in these regions can not be stated that net cash expenditures would change statistically significantly when changing the risk of poverty. However in the Nitra region net cash expenditures change with 95% confidence by changes in the risk of poverty and in the Košice region is these confidence at 99% level.

Regression parameters estimation can be written to the following equations:

$$NCE = 2.59 * NGMWE^{0.73} * {}_{BA} RPR^{-0.05} \tag{4}$$

$$NCE = 1.77 * NGMWE^{0.82} * {}_{TT} RPR^{-0.12} \tag{5}$$

$$NCE = 2.96 * NGMWE^{0.74} * {}_{TN} RPR^{-0.12} \tag{6}$$

$$NCE = 19.35 * NGMWE * {}_{NR} RPR^{-0.27} \tag{7}$$

$$NCE = 8.62 * NGMWE^{0.6} * {}_{ZA} RPR^{-0.16} \tag{8}$$

$$NCE = 6.11 * NGMWE^{0.6} * {}_{BB} RPR^{-0.01} \tag{9}$$

$$NCE = 16.39 * NGMWE^{0.51} * {}_{PO} RPR^{-0.17} \tag{10}$$

$$NCE = 71.71 * NGMWE^{0.42} * {}_{KE} RPR^{-0.57} \tag{11}$$

Source: Own processing.

Exponents' values express directly elasticity parameters. The first regression coefficient represents elasticity of net cash expenditure in consideration of the nominal gross monthly wage and the second regression coefficient characterize elasticity of net monetary expenditure relative to the risk poverty rate. If the gross wage of employees' increases by 1%, the net cash expenditure may increase in each region, but it will increase most in the Trnava (TT) region by 0.82%, while in the Košice (KE) region it will rise only by 0.42%. The elasticity with regard to the second regression coefficient is only relevant in the regions where the coefficient has been shown as statistically significant, ie in the Nitra (NR) and Košice regions. If the risk of poverty rises by 1% in the Nitra region, its inhabitant may spent as net monetary expense a value reduced by 0.27%. In case of Košice region net monetary expenditures will decline by 0.57%.

4   Conclusion

The regression and correlation analysis examining the dependence of net cash expenditures on the nominal gross monthly wage and the poverty risk rate applying the power regression model confirmed the strong dependence between the variables in all regions in Slovakia. The strongest dependency was observed in the Trnava (TT) and Košice (KE) regions. In each of analysed self-governing regions in Slovakia chosen model explained changes in the dependent variable with 99% reliability. The indiviual variable nominal gross monthly wage is statistically significant for all regions and shows a positive correlation with net cash expenditures. Poverty risk rate has become statistically insignificant for all regions except Nitra (NR) and Košice, which suggests that, with the exception of the above-mentioned regions, net cash expenditure will not change with statistical significance due to risk rate of poverty changes. In the Nitra and Košice regions, the dependence of net cash expenditures and the risk of poverty was found to be negative. With a one-percentage change in the nominal gross monthly wage the net cash expenditures will change by 0.42-0.82% in regions of the Slovak Republic. The net cash expenditures may decrease by 0.57% in Košice and by 0.27% in the Nitra region due to a one-percentage increase in the level of risk poverty rate.

Acknowledgement

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LIQUID BIOFUEL MARKET AS A BASIS FOR SUSTAINABLE DEVELOPMENT IN UKRAINE

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Abstract

The article considers and generalizes the methodical approaches to understanding the essence of the concepts of "biofuels", "bio ethanol", "biodiesel". The present state of formation and development of liquid biofuel market in the worldand in Ukraine is analyzed. It is pointed out that at present in Ukraine production of biological fuels is almost stopped, however, the decision of the problems of biofuel production will depend on the coordination of joint actions of the state and participants in market relations. The necessity of development of liquid biofuel market in Ukraine is substantiated and measures are proposed to promote the development of liquid biofuel production for achievement of the international obligations of Ukraine concerning motor biofuel and ensuring sustainable development in Ukraine. Analysis of indicators of requirements for the sustainabality of biofuels and biodiversity in the EU and them implementation in Ukraine.

Keywords: *biodiesel, bioenergy, bioethanol, biofuels, liquid biofuel market, sustainable development.*

JEL classification: *R11; Q16; Q42; P28*

1   Introduction

The energy sector of Ukraine is an economic basis of state sovereignty, an element of good governance, a sound basis for the sustainable development of a competitive economy and an integral part of the European energy space.

A modern energy development strategy in most European countries involves the widespread use of energy from renewable and non-polluting sources of energy (RES), including biomass and liquid biofuels in particular. Liquid biofuels continued to represent the vast majority of the renewable energy contribution to the transport sector. In 2016, they the majority of transport energy use.

Dependence on imported petroleum products makes Ukraine vulnerable to fuel supply. This is especially true for agrarians: it is impossible to conduct a stable business and perform a complex of agricultural works without a stable supply of fuel and lubricants to the industry. Alternative sources of energy would play a significant role in the achievement of energy and gasoline independence.

Nowadays as a replacement, on the first place are considered biofuels. In Directive 2009/28/EC, "bioliquids" means liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass [5].

Ukraine has huge potential in biomass production, especially for first generation biofuels extraction. Main promising feedstock sources are agricultural commodities, primarily grain and corn for bioethanol, rapeseed, sunflower and soybean for biodiesel.

The research market for liquid biofuels consists of several basic segments of products: bioethanol and biodiesel.

Ethanol is the oldest, by far the largest and the fastest growing biofuel in the world, a realistic alternative to much of the fossil oil. In terms of volume, ethanol is the largest biofuel in the world and accounts for about 90 percent of global consumption [12]. Ethanol is most often produced from sugar and starchy crops such as sugar cane, sugar beet and wheat. But in Ukraine the most more popular crops for production bioethanol are corn, sugar beet (molasses) and wheat.

After ethanol, the second most important liquid biofuel is biodiesel made out of fats and vegetable oils such as rapeseed, sunflower, and soy [9]. Many factors would influence the liquid biofuel production cost, including materials price, conversion efficiency and production scale.

In Ukraine the liquid biofuel (bioethanol and biodiesel) production is slowly developing for lack of real government assistance. In the recent years Ukraine was working on fulfilment of European standards in the sector of biofuels. Producers will be able to count on certain profitability only after legislative authorization of the standards of the obligatory biofuel additives in traditional petrol.

The novelty of this paper is that it provides a comprehensive analysis of the use and production of liquid biofuels in transport sector over the past five years and analyses this topic in more detail. This paper also includes a discussion on the prospects of using liquid biofuels in transport sector in the future.

2   Data and Methods

The method used for this paper is to some extent a review and synthesis of the existing literature.

The economic impact of bioenergy is presented by conducting a meta-analysis contrasting and combining results from various studies, biomass supply scenarios and global models linked to land, water and energy use, and climate change in terms of food- energy-, environmental security. The combinations of following terms were used to search relevant studies: food-, energy- and environmental security, food demand, yield trends, renewable energy, biomass, biofuels, by-products for livestock feeding from biofuel production, land-use change, biofuels and the environment, sustainability requirements, cl imate change mitigation.

The efficiency of alternative biofuel policies in achieving energy, environmental and agricultural policy goals is assessed using economic cost-benefit analysis for sustainable development.

3   Results and Discussion

According to a new market research report "Bioethanol Market by Feedstock (starch-based, sugar-based, cellulose-based), End-Use Industry (transportation, pharmaceuticals, cosmetics, alcoholic beverages), Blend (E5, E10, E15 to E70, E75 to E85), and Region – Global Forecast to 2022", published by MarketsandMarkets™, the market is estimated at USD 53.19 Billion in 2017 and is projected to reach USD 68.95 Billion by 2022, at a CAGR of 5.3% from 2017 to 2022 [2].

Global bioethanol market segmented by: raw material (grains, sugarcane, industrial beets, others) type (corn-based ethanol, wet milling, dry milling, sugarcane-based ethanol (cellulosic ethanol others), Blend: (E10, E20 & E25, E70 & E75, E85), generation (first generation, second generation, third generation), application (transportation, power generation, medical).

Due to unique geographical position and the energy dependence, Ukraine plays essential role in European energy market. On one hand, Ukraine is an energy-dependent country with insufficient volume of its own conventional energy sources (oil and gas). On the other hand, Ukraine is important for the global energy markets, being a major transit centre for exports of Russian oil and natural gas to both eastern and western Europe.

In 2013 Cabinet of Ministers signed new Energy Strategy until 2030. Strategy proposes objects for biomass utilization in electricity generation that should reach 2.4 % from the total renewable electricity and only 0.1 % from the total

electricity produced in Ukraine. Meanwhile it does not cover the usage of biomass in heat supply. The sector of liquid biofuels

Table 1 **Biodiesel and bioethanol development in the Energy Strategy until 2030**

	2010	2015	2020	2025	2030
Bioethanol consumption, million tons	< 0,11	0,3	0,6	0,8	1,1
Biodiesel consumption, million tons	0	0	< 0,1	0,3	0,8
Total consumption of biofuels	< 0,1	0,3	0,6	1,1	1,9
Share of biofuels in motor fuels consumption (%)	< 0,1	2,5	4,5	7,2	10,9

Source: Energy Strategy of Ukraine until 2030, 2013.

is the only sector of bioenergy, development of which is described in the document. One third of 33.7 billion m3 (in 2015) of consumed natural gas is necessary to be replaced by biofuels. In the baseline scenario the shift to the usage of gasoline containing 10% bioethanol until 2020 and 15% – by 2030 is planned. According to the ES, the expansion of biodiesel as motor fuel happens after 2020. Further up to 2030, will be made a transition to use of biofuels with 7 % of biodiesel [11].

Information of biodiesel and bioethanol development in the Energy Strategy until 2030 is shown in the table 1.

Table 2 **Energy balance of liquid biofuels in Ukraine for the period from 2011 to 2016**

	2011	2012	2013	2014	2015	2016
Production liquid biofuels, kt	9,73	60	66	26	16	6
Import				38	46	58
Export					-9	-6
Domestic supply			66	64	53	58
Final consumption	9,73	60	66	64	53	58

Source: Energy balance (productive) of Ukraine 2011 – 2016 [8].

In Ukraine, the main producers of bioethanol are enterprises based on the State Enterprise Ukrspyrt, the priority of which is the introduction of energy saving technologies, the use of alternative fuels, renewable energy sources and raw materials in all technological processes. SE Ukrspyrt produces 1320 tons of

bioethanol per month. The total production capacity is over 36 million decaliters a year (360 million liters per year) [14].

Information of Energy balance of liquid biofuels in Ukraine for the period from 2011 to 2016 is shown in the table 2.

The main reason for reducing the production of liquid biofuels and technical alcohol is the lack of incentive policies of the state in relation to the used alternative fuels, the imperfection of regulatory and tax policy and the state tax policy, the failure to implement decisions already taken, the insufficient level of informing market players about existing opportunities in this area while alcohol production capacity is only 25 %.

A formal commitment to meeting the 10% RES-T target in Ukraine by 2020 has been established through the adoption of the National Renewable Energy Action Plan (NREAP) (CMU Ordinance no.902, October 2014). This sets out an ambition to meet the target primarily through the supply of biofuels. However, at present Ukraine lacks the legislative and regulatory framework necessary to facilitate the sustainable production and supply of biofuels in the country. Enabling this will be crucial to meeting the aforementioned target. Thus, preparing and adopting relevant legislative acts will be essential in order to establish the conditions for the introduction of biofuels & bioliquids, and their subsequent contribution towards the renewable energy targets established in the Renewable Energy Directive.

The principal legislative measures in Ukraine related to biofuels are:

- Law of Ukraine "On Alternative Energy Sources"(No. 555-IV dated 20 February 2003). This law defines legislative, economic, environmental and institutional framework for the use of RES and encourage their extended use in the fuel and energy sector.
- Law of Ukraine "On Alternative Types of Fuel" (No. 1391-XIV dated 4 January 2000). This law defines biofuels for the purposes of production and consumption in Ukraine. In June 2014 an amendment to Article 2 of this law was adopted which formally sets out the biofuel ambitions within the Ukraine by establishing targets for bioethanol use in transport. These are:
- in 2013 – recommended content of 5 % (by volume);
- from 2014-2015 – mandatory content of 5 %;
- from 2016 onwards – mandatory content of 7 %.

While these targets have been established, they have not been enforced to date. Moreover, several other measures related to biofuels that are set out in Directive

2009/28/EC (RED) have not yet been transposed, in particular the sustainability criteria for biofuels and bioliquids [6].

In relation to Ukraine below in Table 3 specifies the amount of biofuels needed to achieve the target for 2020 as predicted in Ukraine by the NREP. In 2020, it will take about 630 million liters of ethanol and 90 million liters of biodiesel. The expected installed and planned capacity of ethanol production is about 120 kT (150 million liters), sufficient to meet about a quarter of the target group of ethanol by 2020. The domestic production in 2012 amounted to 50-70 kT (60-90 million liters). Please note that NREAP has an ambition to meet all of this internal supply demand, so there is currently a significant gap in production capacity. There is currently no commercial production of biodiesel in Ukraine.

Table 3 **Biofuel consumption forecast until 2020 for Ukraine**

	ktoe	M.litres	Notes
Biodiesel	70	89	100% domestic supply
Ethanol	320	630	100% domestic supply
Total	390	719	

Source: NREAP

Sustainable development of bioenergy is an integrated part of the general sustainable development of society. The European Commission pays big attention to the issues focusing on sustainable production of biomass and bioenergy. Some of the sustainability requirements are binding for the EU countries (production of biofuels and bioliquids). General trend is toughening of the sustainability requirements [1].

Now the sustainability requirements for biofuels and bioliquids in the EU are determined by Directive 2009/28/EC on the promotion of the use of energy from renewable sources and Directive 2009/30/ЄC9 regarding the quality of transport fuels [6].

Directive 2009/28/EC sets a mandatory 10 % minimum target to be achieved by all Member States for the share of RES in transport sector by 2020. At that the proportion of biofuels from food crops that can be counted towards the 2020 renewable energy targets is limited to 7 % of the final energy consumption on transport, and the contribution made by biofuels produced from wastes, residues, non-food cellulosic material and lingo-cellulosic material shall be considered to be twice that made by other biofuels. It is also noted that biofuel production should be sustainable. Biofuels used for compliance with the targets laid down

in this Directive, and those that benefit from national support schemes, should therefore be required to fulfil sustainability criteria.

The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 % until 31.12.2017 and at least 50 % from 01.01.2018 for biofuels and bioliquids produced in installations in which production started before 05.10.2015.

Biofuels produced in new installations (that is production started after 05.10.2015) must achieve GHG emission savings of at least 60% in comparison with fossil fuels. It should be noted that the requirements are new, they were included in Directive 2009/28/EC by Directive (EU) 2015/1513 of the European Parliament and of the Council in September 2015 and they are more strict than the original ones of 2009 [7]. The greenhouse gas emission saving from the use of biofuels and bioliquids shall be at least 35 %. With effect from 01.01.2017 the GHG emission saving shall be at least 50 %, and from 01.01.2018 it shall be at least 60 % for biofuels and bioliquids produced in installations in which production started on or after 01.01.2017.

At present, the use of voluntary schemes recognized by the European Commission is the most common way of demonstrating compliance with sustainability criteria. For a voluntary scheme to be recognized by the Commission, it must fulfil criteria such as (any changes in the schemes must be notified to the Commission so that to be assessed and the Commission be able to establish whether the schemes still adequately cover the sustainability criteria): (feedstock producers comply with the sustainability criteria; information on the sustainability characteristics can be traced to the origin of the feedstock; all information is well documented; companies are audited before they start to participate in the scheme and retroactive audits take place regularly; the auditors are external and independent; the auditors have both the generic and specific auditing skills needed with regards to the scheme's criteria [4].

The main standards that determine the requirements for sustainability criteria are: European standard CEN 16214-1:2012: Sustainability criteria for the production of biofuels and bioliquids for energy applications – principles, criteria, indicators and verifiers 19 was adopted in 2012 [13].

Published in 2015, the ISO 13065 standard on Sustainability Criteria for Bioenergy provides a framework for evaluation of environmental, social and economic sustainability of different bioenergy products and supply chains, including biofuels. It specifies a set of principles, criteria and indicators that should be used in sustainability assessments. The standard deals only with direct impacts, defined as those that are "under the direct control of the economic operator and caused by the process being assessed" [10].

4   Conclusion

From a sustainability perspective, biofuels offer advantages as well as risks. On the upside, biofuels can contribute to increased energy security, help reduce GHG emissions, improve air quality in cities and, in the process, spur growth in rural areas. On the downside, expansion of biofuels, especially under intensive production systems, could have negative impacts on biodiversity (e.g. replacement of natural forest with biofuel crops, spread of monocultures), water availability under scarcity, water quality, soil degradation, negative carbon and energy balances, potential conflict with food production and food security, as well as worsening GHG emission levels because of indirect land-use change.

Balancing the economic benefits with environmental and social impacts is a delicate act. Even when biofuels meet some environmental and social sustainability criteria, they need to first pass the economic sustainability (or viability) test. This means ensuring efficiency of production (through high yields and intensive management) and long run profitability, access to productive resources (e.g. land, labour, technology), and reliable output markets. The challenge is achieving all this while ensuring economic viability and minimizing potential negative social or environmental impacts.

Economic sustainability (viability) requires long-term profitability, minimal competition with food production and competitiveness with fossil fuels. The economics of biofuels have been in part driven by active policy support measures (subsidies and mandates) which makes it difficult to assess the long run economic viability of biofuels systems current or future. However, the protection of the domestic biofuel industry (sugarcane ethanol in Brazil from the 1970's, US corn-ethanol and EU rapeseed – biodiesel), have managed to develop the economies of scale and cut long run costs through the introduction of technological improvements (diversification and market opportunities for by-products; efficient internal energy consumption etc) [12].

It should be noted that, in general, Ukraine's current legislation provides a proper basis for the sustainable development of the market for alternative fuels in Ukraine. In particular, this applies to tax benefits granted by the state to participants in this market. However, the use of economic incentives and the definition of a stable strategy for the development of the market for liquid biofuels will increase the production of ethanol, biodiesel or other types of liquid or gaseous biofuels from raw materials of agriculture and forestry. This will replace the use of fossil fuels for both stationary (for example, biodiesel for power plants) and for mobile use (motor fuels).

Most importantly, Ukraine has built legislative base which aims to support the industry development and offer large scale of benefits. But due to high excise duty, low oil prices and no penalties for not achieving established indicators, the biofuel industry still stays non operating.

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THE WORKING POOR IN THE EUROPEAN UNION

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Abstract

The aim of this study was an attempt to identify the working population at risk of poverty in the 28 European Union countries. Also, this paper attempts to define the poor population and to subsequently determine its levels and structures. It was noticed that the size and scope of poverty mostly depend on the intensity of work while the responders' age plays a minor role. As noted in this paper, the greatest risk of poverty affects those who work for up to 20% of their full annual potential working time, as well as representatives of two opposite age brackets: young people aged 15-24 and people over 65. This paper emphasizes the relative nature of the poverty risk, which depends on the location and the socio-economic development level of the country concerned. In EU countries, the distribution of poverty depends on the position held by individuals on the labor market, including the intensity of work. The EU-SILC studies identify five types of work intensity: very low (0.0-0.2), low (0.2-0.45), medium (0.45-0.55), high (0.55-0.85) and very high (0.85-1), depending on the full annual potential working time. The higher is the intensity of work, the lower is the risk of poverty. Empirical materials are based on EU-SILC (European Union Statistics on Income and Living Conditions) partial studies which provide a reference point for comparing the EU income distribution and social integration statistics.

Keywords: *Standard of living, working poor, poverty risk, European Union, social exclusion*

JEL classification: *O12, I32, D81, J81, P46, Z13*

1   Introduction

Poverty and social exclusion are the subject of many empirical studies because of the growing number of people unable to meet their needs as expected (Marcysiak and Prus, 2017). This is a multidimensional and extremely complex problem as poverty takes various forms, depending on the context, place or capacity do deal with it. In previous discussions, the main at-risk-of-poverty groups were believed to be the unemployed (Healy 2017, ILO 2016, Quy 2016, FRA 2014, Kryńska, Kwiatkowski 2011, Kryńska 2001, Stiglitz 2009, Corcoranm, Hill 1980), the disabled (Kowalczyk, Gilga, Jurek 2012, Emerson 2007), the poorly educated (Connelly, Sullivan, Jerrim 2014, Serneels, Dercon 2014), the elderly (Kubicki 2013, Kałuża, Szukalski 2010), children (UNICEF 2016, Wójcik 2011, OECD 2015, Warzywoda-Kruszyńska 2008), women (European Commission 2017, Scott 2008, Lister 2007, Ruspini 2001, Corsi, Botti, D'Ippoliti 2016) and the rural population (Prus, 2010, p. 9; Prus and Drzażdżyńska, 2017; Rakodi 2014, Kalinowski 2015, Kalinowski, Łuczka-Bakuła 2007, Herman 2016). However, the growing unemployment and the unfavorable socio-economic situation of some countries marked the emergence of new at-risk-of-poverty groups: people under flexible employment contracts, the population with uncertain incomes and those paid the lowest wages. These people are referred to as precariat by Guy Standing (2014). Because of the growing importance of that group, an attempt was made to determine the extent of the working poor problem in the European Union. This paper joins the discourse on the relationship between work and poverty which results in the inability to meet the individuals' needs as expected.

2   Data and Methods

Empirical materials included in this paper are based on EU-SILC (European Union Statistics on Income and Living Conditions) partial studies delivered by Eurostat (http://ec.europa.eu/eurostat/data/database) and provide a reference point for comparing the EU income distribution and social integration statistics. EU-SILC has been used since 2003 (initially, in Austria, Belgium, Denmark, Greece, Ireland and Luxemburg; subsequently, from 2004, in all EU countries) to monitor the social policy with the Open Method of Coordination (OMC). These studies are a universal tool focused on incomes, especially including personal income, poverty, social exclusion and standards of living. The population surveyed as a part of EU-SILC is composed of households located in specific countries. Surveys are conducted with all household members aged 16 or more. The survey assumes that the employee's income is the total remuneration disbursed in cash or

in kind by the employer to the employee in return for work done during a specific period.

The cluster analysis relied on the Ward's method, one of the agglomerative clustering methods. The distances between clusters were estimated with Euclidean distance which means geometric distance in a multidimensional space, calculated with the relevant formula (1).

$$(x,y) = (\textstyle\sum_i (x_i - y_i)^2)^{\frac{1}{2}} \tag{1}$$

The method is highly efficient as it creates small clusters. It enables full control over the resulting number of groups and presents the most natural clusters. In the Ward's method, steps are performed in the following order: 1) Determining the n x n taxonomic distance matrix which includes the distance between each pair of objects. The matrix is symmetric about its leading diagonal; all of the diagonal entries are zeroes; 2) Searching for object pairs (and, later on, for clusters) with the smallest mutual distance. It has to be assumed that the objects are numbered "p" and "q" with p < q; 3) Merging "p" and "q" into a new cluster replacing item "p." At the same time, object (cluster) "q" is removed and the subsequent numbers of clusters are reduced by one. As a result, the dimension of the matrix is reduced by 1; 4) The distance of the new cluster from every other cluster is calculated as follows: $D_{pr} = a_1{}^* d_{pr} + a_2{}^* d_{qr} + b^* d_{pq}$ (with: r goes through cluster numbers other than "p" and "q"; D_{pr}: distance of the new cluster from cluster "r"; d_{pr}: distance of the original cluster "p" from cluster "r"; d_{qr}: distance of the original cluster "q" from cluster "r"; d_{pq}: mutual distance between original clusters "p" and "q"; a1, a2, b: parameters).

3   Results and Discussion

Deprivation is strictly related to the employment issue because labor is the source of income which largely determines the way of addressing personal needs. However, today's trends on the labor market, especially the structural shortfall in employment, the growing competition on the supply side of the market and the instability of employment are the reasons why, in addition to the existing disadvantaged groups (unemployed, disabled, dysfunctional people), the working population referred to as working poor are also at risk of deprivation. According to E. Polak (2011), that group includes economically active people with low-paid jobs. Their disadvantageous position is reflected by the lack of privileges available to unemployed people, and their incomes are not enough to ensure a decent standard of living. An interesting summary of key reasons behind poverty was

provided by K. Drela (2015) who identified three groups of reasons: job and employment quality, household structure, and individual risk factors.

A characteristic aspect of the working poor is a job with no development opportunities which strengthens their sense of social exclusion, and the economic and social instability. As a group, the working poor are not homogenous; the individuals considerably differ from each other. Meanwhile, their common characteristics are the instrumental nature of their work and precarity of employment. These are the features they share with other communities of the secondary labor market, such as *freeters* and the population with uncertain incomes.

The level of incomes is a co-determinant of living standards and the reason for the fragmentation of needs. While low incomes do not provide enough information to assess the risk of poverty, they are among the assessment criteria for processes taking place in economic and social life. Though they do not allow for an unambiguous evaluation of living conditions, they enable making a rough estimation of the degree to which one's material and spiritual needs are addressed. The essence of incomes results from their impact on the development of the size and structure of demand (cf. Gutkowska 1997; Chmielewska 2004; Kalinowski 2015). In the European Union, people with disposable income below 60% of the national median income are assumed to be at risk of poverty. Below that threshold, incomes are considered insufficient to address the individuals' needs. Whether the persons below that limit are actually unable to meet their needs and experience poverty depends on a series of other factors, including ownership of durable goods, and intensity, duration and severity of poverty.

Although the risk of poverty or social exclusion follows a consistent downward trend, it continues to be a major problem for EU countries. Despite the decreasing risk of falling below the poverty threshold, that matter is considered to be among the fundamental issues, as reflected in the Europe 2020 strategy (Molle 2015). According to the assumptions, the at-risk-of-poverty population must be reduced to a total of 20 million by 2020. Note also that currently 118 million people continue to be affected either by poverty or by social exclusion. This suggests that nearly one quarter of the European Union population are unable to sufficiently address their needs. The highest percentage of people with incomes below the defined threshold live in Greece (35.6%), Romania (38.8%) and Bulgaria (40.4%), whereas the lowest shares are reported in the Czech Republic (13.3%), Finland (16.6%) and the Netherlands (16.7%). In the EU-28 group arranged by ascending percentage of people at risk of deprivation of needs, Poland is ranked 14th with 21.9% of the population being at risk of poverty. However, if the poverty threshold is set at 60% of median equivalent income, that population decreases to 87.9 million, i.e. 17.3% of the total population.

Poverty is strongly related to unemployment. While employment is believed to be the best protection against poverty, some research suggests that the employed group also includes a noticeable share of people who struggle to meet their needs. In the concept of this study, important information is provided by the at-risk-of-poverty rate among employed people. This is because it allows to determine how many employees are unable to reach an acceptable standard of living. In the group of member countries, 9.6% of all employed people earn a remuneration that does not allow them to sufficiently address their needs (considering all persons aged 18+). In this case, too, the highest share is reported in Romania (18.9%) and Greece (14.1%) while the lowest levels are recorded in Finland (3.1%) and Czech Republic (3.8%) (Table 1).

Table 1 **In-work at-risk-of-poverty rate (18+)**

GEO/TIME	2008	2010	2012	2014	2016	2017
European Union	:	:	8.9	9.5	9.6	:
European Union (28)	:	8.3	8.9	9.5	9.6	
Euro area (19)	8.1	8.0	8.6	9.4	9.5	:
Austria	8.5	7.5	8.1	7.2	8.3	:
Belgium	4.8	4.5	4.5	4.8	4.7	:
Bulgaria	7.5	7.7	7.4	9.2	11.4	:
Croatia	:	6.3	6.0	5.7	5.6	:
Cyprus	6.3	7.3	7.9	7.8	8.2	:
Czech Republic	3.6	3.7	4.5	3.6	3.8	:
Denmark	5.0	6.5	5.2	4.9	5.3	5.3
Estonia	7.3	6.5	8.3	11.8	9.6	:
Finland	5.1	3.7	3.8	3.7	3.1	:
France	6.5	6.5	8.0	8.0	7.9	:
Germany	7.1	7.2	7.8	9.9	9.5	:
Greece	14.3	13.8	15.1	13.4	14.1	:
Hungary	5.8	5.3	5.7	6.7	9.6	:
Ireland	6.5	5.5	5.6	5.4	4.8	:
Italy	9.0	9.5	11.0	11.0	11.7	:
Latvia	10.5	9.4	8.6	8.1	8.3	8.8
Lithuania	9.4	12.6	7.6	8.3	8.5	:
Luxembourg	9.4	10.6	10.2	11.1	12.0	:
Malta	5.1	5.9	5.2	5.7	5.8	:

GEO/TIME	2008	2010	2012	2014	2016	2017
Netherlands	4.8	5.1	4.6	5.3	5.6	:
Poland	11.5	11.4	10.4	10.6	10.8	:
Portugal	11.8	9.7	9.9	10.7	10.9	:
Romania	17.7	17.9	19.0	19.8	18.9	:
Slovakia	5.8	5.7	6.2	5.7	6.5	:
Slovenia	5.1	5.3	6.5	6.4	6.1	:
Spain	11.3	10.9	10.8	12.5	13.1	:
Sweden	6.8	6.5	6.7	7.8	6.7	:
United Kingdom	8.5	6.8	9.0	8.7	8.6	:

: not available

Source: own calculations based on Eurostat (2018), SILC: Income and living conditions, online data code ilc_iw01.

Although the relative poverty threshold expressed in monetary value varies considerably from one country to another, the at-poverty-risk rate has a significant informative value. This is because the relative threshold takes into account the socio-economic development level of the country considered, and therefore corresponds to the local standards of living. That threshold is regarded as the minimum acceptable standard of living (cf. Topińska, Ciecieląg, Szukiełojć-Bieńkuńska 2008, Rusnak 2011). Thus, people falling below the poverty threshold face the risk of having their needs not sufficiently addressed which results in material deprivation. Note however that the situation of an average poor person varies from one country to another. In the wealthiest countries (Denmark and Luxembourg), the threshold set at 60% of median annual incomes is EUR 28,665 and EUR 33,818, respectively. In the poorest ones (Romania and Bulgaria), the corresponding figures are barely EUR 2,448 and EUR 3,151 (Eurostat 2018). Distinguishing the poverty thresholds makes sense because the costs of living vary between the countries, and an identical threshold for the entire EU could blur the picture of the socially excluded group.

It is worth taking a look at the similarity of specific countries in terms of levels of, and changes to, the at-poverty risk among employed people (in 2005-2013). For that purpose, the Ward's cluster analysis is a useful tool as it allows to group the countries by estimating the distances between clusters based on the variance analysis approach. Three groups of countries were identified with the use of this method. The first one was composed of Belgium (BE), the Netherlands (NL), Czech Republic (CZ), Finland (FI), Denmark (DK), Malta (MT), Croatia (HR),

Slovakia (SK), Ireland (IE) and Slovenia (SI) with an average risk-of-poverty rate of 5.2%. The next group includes Bulgaria (BG), Germany (DE), Estonia (EE), France (FR), Cyprus (CY), Sweden (SE), Austria (AT), Hungary (HU) and United Kingdom (UK). In these countries, the average level of at-poverty risk among the employed population did not exceed 7.8%. The last group identified was composed of Greece (EL), Spain (ES), Portugal (PT), Poland (PL), Italy (IT), Luxembourg (LU), Latvia (LV), Lithuania (LT) and Romania (RO). In that group, the average share of people at risk of inability to meet their needs ranged from 9.2% to 18.6%. The large distance between the groups demonstrates the absence of any major similarity between them (Fig. 1).

Figure 1 **Cluster analysis – bonds tree diagram Ward method (Euclidean distance)**
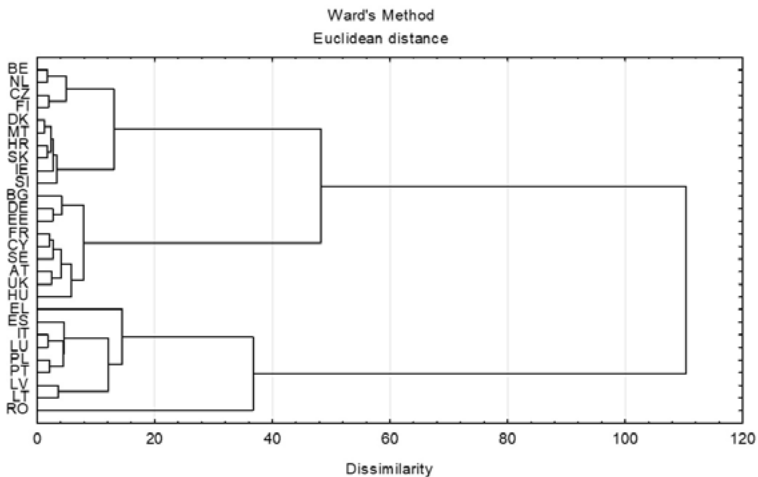
Source: own calculations based on Eurostat (2018), SILC: Income and living conditions, online data code ilc_iw01.

Although according to previous research, women are more strongly affected by poverty (Bradshaw, Finch 2003; Daly, Rake 2003; and other), Eurostat data suggests that the risk of poverty among workers is slightly correlated to gender. Interestingly, while men are the group at a higher risk of poverty (10%), the difference at EU level does not exceed 0.9 percentage points. The largest discrepancy exists in Romania (6.3 percentage points). Only in five countries (Germany, Luxembourg, Cyprus, Czech Republic, Hungary) women workers face a higher risk of poverty than men (Fig. 2). Note however that as regards households with

incomes above the relative poverty threshold, the distribution of incomes may be uneven, and the needs of women might not be sufficiently addressed.

Table 2 **In-work at-risk-of-poverty rate by gender - EU-SILC survey**

GEO/SEX	Males	Females	M-F
Austria	8.6	7.9	0.7
Belgium	4.8	4.6	0.2
Bulgaria	13.0	9.6	3.4
Croatia	6.7	4.2	2.5
Cyprus	8.0	8.5	-0.5
Czech Republic	3.7	3.9	-0.2
Denmark	5.6	4.9	0.7
Estonia	9.9	9.3	0.6
Finland	3.3	2.9	0.4
France	8.2	7.6	0.6
Germany	8.1	11.0	-2.9
Greece	15.3	12.3	3.0
Hungary	9.4	9.9	-0.5
Ireland	4.9	4.7	0.2
Italy	13.2	9.5	3.7
Latvia	8.4	8.2	0.2
Lithuania	9.3	7.7	1.6
Luxembourg	11.5	12.7	-1.2
Malta	7.5	3.1	4.4
Netherlands	6.1	5.0	1.1
Poland	11.9	9.5	2.4
Portugal	11.3	10.5	0.8
Romania	21.5	15.2	6.3
Slovakia	6.9	6.0	0.9
Slovenia	7.1	4.8	2.3
Spain	13.7	12.4	1.3
Sweden	7.0	6.4	0.6
United Kingdom	9.0	8.1	0.9

Source: own calculations based on Eurostat (2018), SILC: Income and living conditions, online data code ilc_iw01.

A higher percentage of men at risk of poverty in the EU is not characteristic for all age brackets. In the groups aged 15-24 and 64+, women relatively more frequently face the risk of deprivation of needs. In the group of the youngest labor market players, the share women at risk of poverty was higher by 1.9 percentage points; in the last group, that difference exceeds 2.1 percentage points. A comprehensive analysis of the risk of poverty in function of age allows to conclude that in most countries, impoverishment affects the young population (Fig. 3). The high share of young people in the working poor population may be easily explained in the context of the situation where young people enter the labor market and gain professional experience. Another factor which makes it easy to fall into the trap of precarity are the increasingly popular internships. While providing an opportunity to gain skills and professional competences, they also adversely affect the standards of living.

Table 3 **In-work at-risk-of-poverty rate by age - EU-SILC survey**

GEO/AGE	From 15 to 19 years	From 20 to 24 years	From 25 to 54 years	From 55 to 64 years	65 years or over
European Union (28)	14.4	11.8	9.7	8.6	8.5
Euro area	13.6	12.3	9.7	8.0	8.0
Austria	9.7	12.5	7.9	7.1	11.1
Belgium	:	4.6	4.9	3.5	9.6
Bulgaria	:	13.5	11.8	10.2	3.6
Croatia	23.7	7.1	5.5	5.0	6.3
Cyprus	:	10.6	8.5	6.9	1.0
Czech Republic	:	3.3	3.9	3.7	1.5
Denmark	8.2	24.3	4.5	4.2	3.2
Estonia	13.8	7.2	10.6	8.2	2.9
Finland	2.2	5.0	3.0	2.9	5.0
France	13.2	12.6	7.9	6.4	4.5
Germany	13.9	13.9	9.2	8.8	10.4
Greece	25.3	19.1	13.2	17.4	20.5
Hungary	2.3	9.1	9.4	11.0	1.9
Ireland	4.3	4.7	4.4	6.8	5.0
Italy	7.3	15.0	12.3	9.0	4.8
Latvia	16.1	7.9	8.3	9.2	4.2
Lithuania	:	7.1	9.4	5.9	0.8

GEO/AGE	From 15 to 19 years	From 20 to 24 years	From 25 to 54 years	From 55 to 64 years	65 years or over
Luxembourg	17.0	11.5	11.9	12.7	10.9
Malta	12.2	2.8	6.0	5.5	11.6
Netherlands	20.0	6.0	5.7	4.9	6.4
Poland	29.6	10.3	10.9	10.6	3.4
Portugal	20.3	11.2	10.5	12.1	14.3
Romania	74.2	27.3	17.9	18.6	43.6
Slovakia	:	2.9	7.0	5.3	6.0
Slovenia	:	6.9	6.0	6.7	6.6
Spain	33.8	17.2	13.7	8.6	11.7
Sweden	27.5	13.6	6.7	3.5	3.3
United Kingdom	4.1	8.9	8.4	9.6	8.9

Source: own calculations based on Eurostat (2018), SILC: Income and living conditions, online data code ilc_iw01.

The relatively high share of at-risk-of-poverty people in the population aged 65+ forces them to seek additional employment which seemingly does not remedy their financial situation. As shown in a study by L. Jabłońska-Porzuczek (2016), as much as 60% of that group experience deprivation of needs.

The distribution of poverty across EU countries depends on the position held by the individual in the labor market, including on labor intensity. The EU-SILC studies identify five types of work intensity: very low (0.0-0.2), low (0.2-0.45), medium (0.45-0.55), high (0.55-0.85) and very high (0.85-1), depending on the full annual potential working time. The higher is the intensity of work, the lower is the risk of poverty. In the group of people with the lowest intensity of work, the average risk of poverty is 36.3% (and over 50% in Romania and Lithuania). Very high work intensity enables reducing the average rate to 4.7%. However, as shown by the studies, even if close to 1, the rate does not guarantee that needs are sufficiently addressed. Note also that in Poland, 6.5% of those demonstrating a work intensity rate from 0.85 to 1 are at risk of poverty. This is one of the highest levels in the EU (Fig. 3).

Table 4 **In-work at-risk-of-poverty rate by work intensity of the household - EU-SILC**

GEO/WORKINT	Very high work intensity 0.85 - 1	High work intensity 0.55 - 0.85	Medium work intensity 0.45 - 0.55	Low work intensity 0.2 -0.45
European Union	5.6	10.0	20.3	40.3
Euro area	5.4	9.5	19.9	39.5
Belgium	2.4	3.7	13.6	25.3
Bulgaria	6.1	14.0	22.8	59.8
Czech Republic	2.5	4.6	10.5	34.4
Denmark	3.0	11.4	4.1	28.7
Germany	6.3	10.0	12.9	41.5
Estonia	7.3	11.9	24.6	40.2
Ireland	1.5	4.2	8.0	16.2
Greece	5.6	11.1	20.7	40.6
Spain	7.2	11.3	25.3	42.8
France	4.2	11.6	19.1	44.0
Croatia	1.3	4.2	15.3	25.9
Italy	6.4	9.3	24.1	40.4
Cyprus	4.8	7.1	11.8	32.3
Latvia	4.6	10.0	22.8	42.7
Lithuania	4.9	12.7	28.9	40.9
Luxembourg	7.8	13.5	25.1	30.9
Hungary	6.7	13.3	16.5	35.7
Malta	1.2	5.1	24.1	29.1
Netherlands	2.5	5.2	14.5	21.9
Austria	5.4	10.6	12.9	27.5
Poland	6.5	11.0	22.5	45.7
Portugal	5.3	12.9	30.9	45.9
Romania	12.6	25.7	32.3	60.4
Slovenia	2.6	7.0	23.3	31.7
Slovakia	3.9	7.3	23.6	42.4
Finland	2.3	2.8	7.4	11.2
Sweden	4.6	11.6	19.2	42.5

GEO/WORKINT	Very high work intensity 0.85 - 1	High work intensity 0.55 - 0.85	Medium work intensity 0.45 - 0.55	Low work intensity 0.2 -0.45
United Kingdom	5.1	8.8	19.8	36.3

Source: own calculations based on Eurostat (2018), SILC: Income and living conditions, online data code ilc_iw03.

Poverty affecting people who reach work intensity rates of 0.85-1 is the most puzzling phenomenon in the economy. Although high work intensity helps reducing poverty even eightfold, it worryingly does not result in a total elimination of poverty. I may be supposed that in the above group, the deprivation of needs most strongly affects people under flexible employment contracts. Nevertheless, that percentage should give pause for thought about the European cohesion policy or the policy of full employment.

4   Conclusion

Poverty among the working population means a disrupting shift in the functions of work in the 21st century. Work is no longer a way to combat poverty. The above also means that the full employment policy model does not prevent economic and social exclusion. On one hand, it could be noted that employment helps addressing one's needs at least to a minimum extent; on the other hand, however, precarious employment may pose the risk of falling into the precarity trap for the entire duration of employment. In many EU countries, because of the growing problem of impoverishment of the working population, a question arises on the essential tools for counteracting exclusion. The in-work poverty rate remains at a worrying level. Therefore, frameworks for government policy measures need to be developed so as to provide the employees with guaranteed incomes that enable addressing their needs beyond biological survival and create a sense of safe living conditions in the long term. The lack of opportunities and an unstable life situation are among the reasons for uncertainty which results in developing passive and conservative attitudes. These groups represent some of those who deny the achievements of today's liberal and democratic policy. As a consequence, this may have an adverse effect on the well being of the population of specific countries.

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ANAEROBIC DIGESTION AS BIOTECHNOLOGY IN AGRICULTURE FOR BIOMASS UTILIZATION

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Abstract

Producing energy from biomass via anaerobic digestion (AD) has experienced a lot of attention in recent years. Biogas can be produced out of many different kinds of organic materials and its options for utilization can be equally versatile and can be used to generate electricity, heat, biofuels or digestate that can be utilized as a fertilizer. The amount of biogas produced can be increased by adding food waste to manure, however, maize silage is the most common input in EU and is 8 times more effective than cow manure in terms of biogas yield per tonne. The paper aims to summarize the main findings of the recent empirical studies related to biogas produced by biogas plants, discuss positive and negative externalities rising from producing energy via anaerobic digestion and give an overview about situation of biogas sector in EU.

Keywords: *anaerobic digestion, bioenergy, biogas, externalities*

JEL classification: *L65, Q57*

1   Introduction

Producing energy from biomass via anaerobic digestion (AD) has experienced a lot of attention in recent years. Primary, the idea of the technology was waste management mainly in livestock production, waste of which represents an intensive agriculture's externality. It seems to be a brilliant solution for two of the main EU`s issues – volatile business environment of farmers and limited conventional energy resources. Input substrate is renewable biomass waste from agriculture and the outcome is electric power, heat and microbes free fertilizer. Due to the high investments costs of biogas plant and low electricity prices, the whole concept is not economically viable and sustainable; therefore subsidy support system has been necessary in order to create a suitable environment for biogas industry growth.

"Anaerobic digestion is a microbial process that occurs in the absence of oxygen. In the process, a community of microbial species breaks down both complex and simple organic materials, ultimately producing methane and carbon dioxide." (Engler et al., 2013). European Biomass Association (2013) defines biogas as a secondary energy carrier that can be produced out of many different kinds of organic materials and its options for utilization can be equally versatile. Biogas can be used to generate electricity, heat and biofuels. Also the fermentation residues, called digestate, can be used, for example as a fertilizer. Agricultural Technical and Testing Institute (2013) describes biogas as a product of transformation of biomass into energy via an anaerobic digestion, where the resulting product is a biogas, serving as fuel for cogeneration units. Biogas reaches about 70% of the energy content of natural gas. Burning 1000 m³ of biogas can be obtained 2 178 kWh of electricity or 11.4 GJ of heat. Also, 1 m³ of biogas also contains as much energy as 0.6 to 0.7 dm³ of fuel oil for heating. Compared with conventional heat and electricity, up to 40% of fuel can be saved. Compressed and adjusted biogas can be supplied to the grid as natural gas. Only additional costs for treating biogas are the barrier, even though there are already developed technologies for such treatment (Holm-Nielsen et al., 2009).

Baxter (2014) points out that there are many ways how to realise flexible output produced by biogas plants. It is possible to store biogas with storage capacity locally and also via pipelines connecting more biogas plants. Excess capacity cogeneration or combined heat and power (CHP) units might be used in times of deficit irregular renewable electricity generator or of the highest demand. There is a concept of many biogas plants linked together for flexible operation created already. Another alternative is to upgrade biogas to natural gas quality. Braun et al. (2015) believes that economic viability of the energy production from energy

crops is possible only if we achieve high crop and biogas yields while keeping investments, raw material and production costs low. What is more, other incentives are provided like subsidies and feed-in-tariffs to increase economics of the process. Then Gebrezgabher et al. (2010) underline that the financial viability of the system also depends on transport of input materials. Some researchers indicate that maximum economical distance is of 15–25 km. Logistics of inputs and outputs are crucial indicator for biogas system to be economically, environmentally, and socially viable. Long distance transportation generates transportation cost as well as environmental costs in form of GHG emissions, odour and noise. Therefore these externalities of the transport should be managed to their minimums. Wellinger (2014) states that biogas plant operators will have to deal with security of sustainability of producing biomass and its higher yields per hectare via catch crop or multiple cropping on arable land. Other possibilities are permanent grasslands. There are also mechanical, physical and biochemical pre-treatment techniques to rice efficiency of biomass degradation. On the other hand Dollhofer (2014) reminds that these mechanical and chemical pre-treatment techniques come hand in hand with significant energy loses as they require high energy input.

The paper aims to summarize the main findings of the recent empirical studies related to biogas production, discuss positive and negative externalities rising from producing energy via anaerobic digestion (AD) and give an overview about situation of biogas sector in EU.

2   Data and Methods

The paper is based on both international and domestic publications addressing the issue of producing biogas by anaerobic digestion. Firstly, the literature on the explanation of anaerobic digestion and its outcomes (biogas, digestate) is substantial. Several reports related to the effects of anaerobic digestion are taken into account and positive and negative impacts on the environment, agricultural market and food production are discussed. The paper also points out the usage of food waste and manure for increasing the amout of biogas produced for creating energy with no net carbon addition. The data presented in this paper are based mainly on the Biogas Report 2014-2017 of the European Biogas Association which were subject to mathematical and graphic processing. The data were analyzed by descriptive and quantitative techniques.

3 Results and discussion

3.1 Possitive and negative externalities rising from producing energy via AD

The amount of biogas produced can be increased by adding food waste to manure as many dairy farms do in the US (Renewable Waste Intelligence, 2013). It is because food waste fats, oils and greases are energy rich and produces more methane than bio solids. AD may be an interesting technology for food and beverage companies to manage a huge amount of organic waste they produce. Partnerships with local municipalities may create economically viable conditions for the technology and increase sustainability of the production and increase the corporate social and environmental responsibility.In the paper of Holm-Nielson et al. (2009), it is shown that there is a lot of animal manure produced in EU and anaerobic digestion of the manure for biogas production effectively cuts down ammonia, methane and other greenhouse gases from stored manure. Transforming manure into biogas via anaerobic digestion creates energy with no net carbon addition to the air and lowers danger from pathogens from land spreading as anaerobic digestion with sanitization procedure neutralize pathogens, added Gebrezgabher et al. (2010).Furthermore, by-products from livestock industries like manure are considered as major reason of environmental pollution. Usually these products have been used directly or after composting process as soil supplements in agriculture. These practices have caused pollution of air, water and soil. The authorsemphasize that except biogas, anaerobic digestion produces also digestate, which contains a mixture of liquid and solid fractions. Applying digestate to land is the most useful way to let nutrients to be recovered and decrease soil degradation caused by agricultural exploitation.Several studies also indicate that anaerobic digestion organic waste origin can be the economical and sustainable solution for these issues. Zacharda (2013) stresses the fact that digestate from BGPs is an organic fertilizer comparable with manure or other kind of fertilizers which has been confirmed by positive results of research and experiments in the fertilization of agricultural crops. He confirms that processingbiomass as agricultural waste via anaerobic digestion is the most rational technology today. Using this technology substrates are exposed to specific temperature for long enough to eliminate pathogens and weed seeds, but the nutritional values retain in substrates. Moreover it decreases emissions that would be spilled into the atmosphere and produces electricity and heat.Zegada-Lizarazu and Monti (2011) state that energy crops are less demanding for fertilizers and pesticides than traditional food crops and require lower level of intensive agricultural approach. With same production techniques like crop rotation, pest management and soil husbandry

farmers can stabilize soil conditions and stabilize their income.Lovrence (2010) analyzed the biogas impact for society and farmers and found out that biogas projects in form of BGPs may have positive influence from socio-economic point of view to each region regarding to rise of employment and investments depending on number of BGPs and their installed capacity. Additionaly, external economies are generated via biogas production and thus it affects consumer utility function (i.e. higher level of sanitary and hygienic conditions) and society's social welfare function (i.e. decrease in health expenditures). At the national level, the biogas influences energy balance by forming external economies via import of fossil fuels substitutes and diseconomies due to drop in import duties of fossil fuels which are substituted by biogas. Monopolistic effects on the electric energy market in many countries let energy suppliers ask higher than competition prices and leave biogas producers compete with distorted prices on the national and regional electricity market. At the competitive market decentralized and economically viable and self-sufficient biogas plants push economy into its optimum. Another positive externality of decentralized energy producing facilities is increased power system security and energy security.

On the other hand,according to Vidal (2007), The United Nations highlights, that large scale energy crops production can significantly decrease biodiversity, cause erosion and nutrient leaching. There are thoughts that energy crops may be grown on the best lands and create an upward pressure on global food prices and increase also cost of emergency food aid. He sees another threat from energy crops production. Energy crops may not be beneficial for farmers either, as growing energy crops can increase cost of cultivations and even cause that the poorest farmers will lose the most important production factor – land. New bio-economy attracts larger and larger companies into the rural areas which push out the local small farmers by controlling prices and owning the rest of the value chain.Additionally,Ogejo et al. (2009) suggested that facilities for anaerobic digestion are capital demanding and have operation costs. That may be the reason why it is not profitable and economically viable. Other problems may occur due to potential relies of gases, traffic movement, noise, and influence of the view and landscape. All the issues connected with anaerobic digestion can be, though worked out by right designed and well established management. Moreover, negative externalities are increasing investment costs due to additional networks costs, costs of losses and transmission costs (Lovrence (2010). Nevertheless, Lapcik and Lapcikova (2011) argue that most biogas plants do not have the negative effect on the landscape in most cases because they are located often as a part of other agricultural or industrial buildings.

3.2   Situation of biogas sector in EU

According toEuropean Biomass Association (2013) usage of biomass as bioenergy source will play the main part in achieving the ambitious goal leading to 20% of the final energy consumption to be produced by renewable sources by 2020, which is approved by the Renewable Energy Directive. Today biomass represents 2/3 of renewable energy sources in EU. Currently RES stands for of 8,5% of final energy consumption. Agricultural industry still poses a huge unutilized room in bioenergy sector believed to experience the highest growth in near future (European Environmental Agency 2, 2006). Even if today forestry is main supplier of biomass used for biogas, according to European Biomass Association (2013), agricultural sector is believed to be the most important source of energy already by 2020. In 2007 share of biogas out of total bioenergy was about 7% but the potential of biomass is at level of 15%-25%. There however is need for actions at local, regional, national and international level. Today it is the maize being nominated as an energy crop for biogas production. There is a wide room for use of by products and wastes from food industry and household waste for energetic use too. There is high possibility that main input for biogas will be animal manure. Today about 50 PJ of energy is produced from energy crops, organic waste and animal manure whereas there is the potential to produce 827PJ solely from animal manure in the EU (Birkmose et al., 2007).

It is necessary to promote usage of biogas plants and therefore the most common and also very efficient tool to enhance the technology of anaerobic digestion are subsidising the sale of electricity produced in biogas plants (Birkmose et al., 2007).Favourable conditions like feed-in-tariffs were created in many states of EU for energy produced from biogas (European Biomass Association, 2013). According to Wellinger (2014), European feed-in-tariffs support system electricity from biogas in agriculture created a successful story. Also the EU legislation managed to treat biowaste through anaerobic digestion rather than open landfilling. There are over 4000 BGPs in Germany, mostly on farms with cogeneration unit that makes Germany the leader in this field.

European Biomass Association (2013) describes different situation across Europe as while in countries like Germany, Austria and Denmark BGPs are used to produce biogas from agricultural commodities and by-products, in UK, Italy, France and Spain, they use landfill gas. This kind of utilization is not expected to have higher growth in future because the EU directive on landfill waste foresees a gradual reduction of the land filling of biodegradable municipal waste. On the other hand, Monbiot (2014) highlights the increasing trend of anaerobic digestion in the UK and warns that there is a similarity with another genius idea behind turning waste chip fat into biodiesel which turned rainforests in Indonesia,

Malaysia and West Africa into oil palm plantations and has a lot higher green-house footprint than fossil fuels it replaces. Further, he explains that the problem is that yields of gas from waste and slurry from cattle and pigs are not high enough to make conversion of wastes economically viable. Searby (2014) refers to Dr. David Styles from Bangor University, UK sees the issue is in high capital investments of AD and the small size of dairy farms so AD technology is not economically viable and that is the reason why the most used input for AD is purposely grown crops. Maize has higher biogas yield per tonne than food waste or slurry so it increases income from subsidies per m^3 AD unit capital investment. Monbiot (2014) agrees that the most suitable commodity is maize which has become the biogas core crop as it has high yield per hectare and also high yield of biogas per tonne and According to National Farmers Union (NFU) there will be 100 – 125 thousands of hectares used for maize alone in the UK if 1000 medium-sized biogas plant using maize along with slurry and manure are built by 2020. In addition, Searby (2014) shows that animal feed supply might get under a pressure due to increase use of anaerobic digestion technology in the UK. Then he explains that processing fodder crops with anaerobic digestion instead of feeding livestock may lead into lack of feed produced in the country and its import will be needed. Further causes may be forest and grasslands turned into fields for other agricultural commodities production. Most of the people do not know that we already have cars running on natural gas for many years now and biomethane might be one of the key power sources in transportation sector. By now, there is only one market for vehicles using biomethane as fuel in Sweden. Thanks to the low prices of electricity, only about 8% is used for electricity, 50% of biogas is used for heating and roughly 25% is upgraded and used in transportation in Sweden (European Biomass Association, 2013).

Bruns et. al. (2009) remind that at the end of the year 2007 started the discussion about national and global effects of bioenergy. The sector was criticized for competition between production of inputs for bioenergy and food production. On the other hand, Zeller et al. (2009) state that most of the regions in Germany have enough feedstock to fulfil needs for both food and biofuel production. Food crops such as wheat and rye are usually used as food crops. Mostly food and energy crops as well are traded on an interregional basis and exported to other countries of the EU, according to which there is no competition between food and energy crops. Bruns et al. (2009) further state that reported environmental and social impacts of bioenergy caused that it lost its positive credit in public. Further it has become obvious that bioenergy had not outrun other forms of renewable energy sources. Even if biogas turned into electric energy is more efficient in terms of yields per hectare and production of CO_2 than biofuels, the decreased

public confidence influenced significantly biogas sector also because there was no public distinction between biofuel and biogas within bioenergy. One of the key weaknesses was lack of heat utilization.

European Biomass Association (2013) believes that usage of energy crops for energy will climb in next 10-20 years and is expected that 10-20 or 30 % of the arable land will gradually move from food and feed production to energy farming. Large European countries like France or Ukraine that have fertile soils may become leaders in bioenergy industry. Importance of crops like maize, sugar beet and others will rise in Europe. An ambitious target of biogas is to replace fossil fuels in electricity, heating and biofuels sector in the whole continent. What is going on in Germany is symptomatic for other countries and that is why it is necessary to ensure continuous growth of the biogas energy as a clean and sustainable energy source. The new target for European Biogas Association is to ensure that 1,5% share of primary energy in the EU will be biogas based by 2020 (conBio, 2014).

The development of biogas plants in Europe has experienced positive trend since 2009 (Figure 1). There was an increase of the total number of biogas plants expernieced from 6 227 to 17 662 installations (+11 435 units). The increase in the number of plants in 2010 compared to the number of plants in 2009 was the greatest with 4 281 new plants which represent an increase of 69%. Significant changes which occurred in different parts of Europe, mainly changes in support schemes caused a slow down in 2013 when a number of plants rose only by 6% in comparison to the previous year. Torijjos (2016) gave an example of the situation in Germany where the number of plants was increasing by more than thousand a year in the period 2009-2011, but after the Renewable Energy Act EEG 2012, the German market was dramatically slowed down and the increase in the number of plants in 2013 was only 335. According to European Biogas Association (2017), most of the growth derives from the increase in plants running on agricultural substrates: these went from 4,797 units in 2009 to 12,496 installations in 2016 (+7,699 units, 67% of the total increase). Agricultural plants are then followed by biogas plants running on sewage sludge (2,838 plants), landfill waste (1,604 units) and various other types of waste (688 plants).

Figure 1 **Evaluation of the number of biogas plants in Europe**
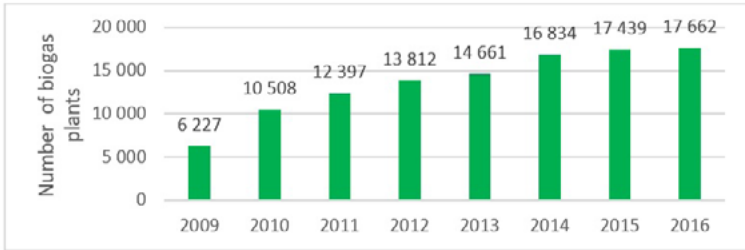
Source: authors´ processing, European Biogas Association (2017)

Figure 2 **Biogas plants in Europe in 2015**
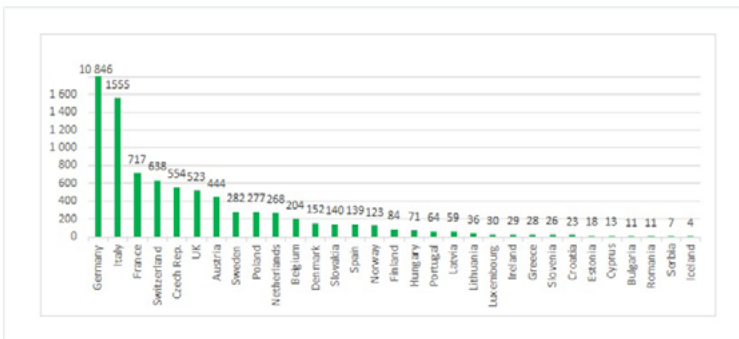
Source: authors´ processing, European Biogas Association (2016)

The installed electric capacity experience upward trend during the period 2010-2016 (Figure 3). In 2016, the installed electric capacity rose by 5 827 MW, reaching a value of 9 985 MW, comparing to 2010 (4 158 MW). The significant increase was recorded in 2012 when the installed electric capacity grew by 2 487 MW (+52%). The installed electric capacity rose by 9% in 2016, compared to the previous year. European Biogas Association (2017) explains that growth in installed electric capacity since 2011 has been mainly due to the building of plants running on agricultural substrates: such plants went from 3,408 MW in 2011 to 6,348 MW in 2016 (+2,940 MW – 56.5% of the total increase).

Figure 3 **Growth in installed electric capacity in Europe**
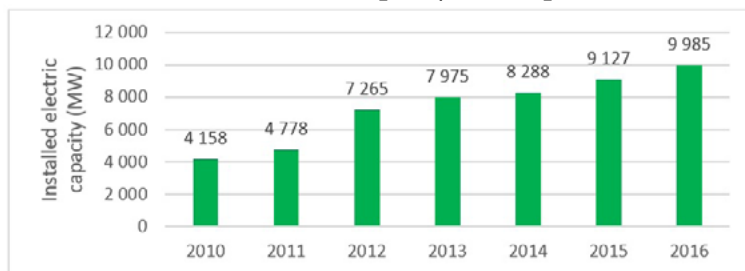
Source: authors´ processing, European Biogas Association (2017)

There was a rapid increase recorded in the development of biomethane production since 2011 (Figure 4). The production rose from 752 GWh in 2011 to 17 262 GWh, representing growth by 16 512 GWh in 2016. The rapid growth was experienced in 2013 when biomethan production went up by 308% in comparison to 2012. The countries which saw the most significant development in biomethane production in 2016 were Germany (+900 GWh), France (+133 GWh) and Sweden (+78 GWh).

Figure 4 **Evolution of biomethane production in Europe**
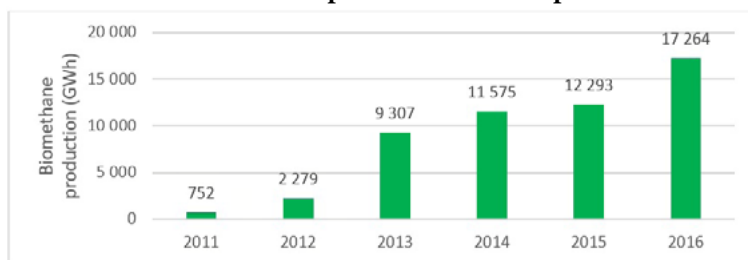
Source: authors´ processing, European Biogas Association (2017)

Conclusion

Biogas can be produced out of many different kinds of organic materials and its options for utilization can be equally versatile and can be used to generate electricity, heat, biofuels or digestate that can be utilized as a fertilizer.This paper presented the overview of the recent empirical studies related to producing energy via anaerobic digestion, dealt with its effects on the environment and agriculture and discuss the situation of the biogas sector in EU. It also discussed the issue of transforming manure into biogas via anaerobic digestion as a suitable alternative

input material instead of e.g. maize that is mostly grown on arable areas of EU and thus leads to the fact that agricultural biogas stations have a negative impact on the landscape (environmental defects on soil, water and biodiversity), increase in land rent, and afterwards massive maize production causes decrease of food crops production and afterward rise in food prices. Therefore, it is essenntial to ensure that producing bioenergy via anaerobic digestion representing secure, clean and efficient energy will be performed by sustainable way and by elimination of negative effects on environment and agriculture e.g. AD may be an interesting technology for food and beverage companies to manage a huge amount of organic waste they produce.

Acknowledgements

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LAND PURCHASE AND LAND LEASE BY AGRICULTURAL COMPANIES IN NITRA COUNTY

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Abstract

Land is important production factor without it the agricultural production could not exist. Agricultural companies can purchase or lease the land and operate on it. In the paper we quantify the net present value by land purchase and land lease by agricultural companies in Nitra County. We apply the calculation on internal rate of return, modified internal rate of return, profitability index, payback period and average profitability to evaluate the efficiency of the land use. Nitra County belongs to the most productive agricultural Counties in Slovakia and thanks to its location also to the hottest and the driest area in Slovakia. It has good climatic conditions to raise various agricultural crop plants. By land lease the percentage of the lease was estimated in range from 0.5 to 3 % from official land price. The value of the land lease was determined by percentage from the official land price in Nitra County in range from 11.86 €/ha to 71.18 €/ha. The net present value by land lease reaches the negative values in this County it means that is not profitable to lease the land by these conditions. To reach the minimal positive value of NPV the land lease should be higher than it is in reality and the official price should be lower. By land purchase we divided the companies on commercial companies and agricultural cooperatives. The indicators reach again negative results. The input indicators as capital expenses, cash incomes were modelled to reach the minimal positive values or to reach acceptable values of chosen indicators of efficiency evaluation.

Keywords: *agricultural companies, land, land lease, land purchase*

JEL classification: *Q15, Q24, M21*

1   Introduction

Natural – geographical conditions have a special position in the structuring the spatial system. They influence the economic development by the creation of conditions for the localization of economic activities. Each region can be characterized by the different system of natural geographical conditions. The regional development is influenced mainly by these conditions: area size, orographic conditions, climate, water conditions, the state of environment, fauna and flora. Except of these factors, the geographical location is important, technical and social infrastructure, economic performance of the region, financial resources, culture and cultural-historical potential, institutions, social capital, innovation potential etc. as well as exogenous factors like economic and social policy, global situation, economic performance of the country etc. (Fazikova et al., 2013)

The value of land rent described by the developers of classical economics differs from that described in modern economics (Rymanov, 2017). In classical economics, rent was considered in terms of the low rate of the tax burden. In conditions of public expenditure growth, its level rose significantly.

Lease of agricultural land is one of the option of land usage for the owners who do not want to operate on it and do not want to transfer its ownership. The legislation on the land use of agricultural land has undergone after the Slovak Republic was established and these changes were aimed at protecting of both owners and tenants. Currently the Act 504/2003 on lease of agricultural land, agricultural companies and forest land is valid. (Pavlíková, 2014)

Considering the fact that vast majority of the agricultural land in Slovakia is rented, the legal acts on tenancy of agricultural land is fabulously important. The largest tenant of agricultural land in Slovakia is the Slovak Land Fund, which manages approximately 5 % of state owned agricultural land and 14 % agricultural land of unknown owners. (Dirgasová, Bandlerová, 2014)

Based on questionnaire survey RIEFA about land lease the farmers lease the land from the private persons (58 %) as well from the Slovak land fund and the lowest share of land lease is from the own members, partners, church (Buday et al., 2016). Overall ratio between own and leased land for operating in agriculture is 1:9. By cooperative of average area of 1.250 ha it is about hundreds to thousands of rental agreements. In Slovakia there is a high degree of ownership fragmentation which makes the land purchase of larger land area very difficult to realize. Foreign competition raises land prices as well as land lease. (Václavík, 2014)

Chakir, Lungarska (2017) compared the performance of econometric land use models based on three proxies for agricultural rent: farmers' revenues, land prices and shadow land prices derived from a mathematical programming model. It is

found that the inclusion of spatial components significantly improves the quality of predictions.

Improving the land-use efficiency (LUE) of farming systems could satisfy increasing global food, feed, biomass and bioenergy demand in a sustainable manner. Lin, Huelsbergen (2017) bring new method for calculating LUE, beginning with an overview of different approaches to assessing agricultural land-use efficiency. This method takes into account the quality and function of agricultural products and the relationship between yield of the assessed farm and the average yield of the reference region with comparable soils, climate and socio-economic conditions.

Agricultural land in Slovakia is possible to purchase cheaper than in western countries of EU. In long-term view there is an estimation that these prices will be equalling so the investment into the land should be profitable. The price of agricultural land is underestimated in comparison with the western EU also due the price increase. The land purchase is long-term investment which will not generate quick profit but the advantage is that it will not lose its value.[1]

The situation in the Czech agricultural sector has improved particularly due to increasing subsidies, non-agricultural subjects are showing increased interest and banks are changing their approach to granting loans for the purchase of farmland. The market price of farmland in the Czech Republic has been rising, in 2015, it exceeded CZK162,500 per hectare on average. Howeever, it is still low compared to the old EU members states. (Severová, Svoboda, Kopecká, 2017)

The agricultural sector is characterized by the fact that there is a high level of risk. The ability of early detection and effective management of the risks is an integral part of the strategic management of every agricultural organisation. Slovakian farmers perceive the price risk, production or income risk as the most important factors, and the diversification as a most important strategy of the risk management. The most significant positive correlations were found between the land size and the perception of the price risk importance, between the number of years in office and the perception of the price risk importance. (Jankelová, Masar, Moricová, 2017)

The purpose of the paper of Matyja (2016) was to examine the relationship between selected resourced based factors and competitiveness of agricultural enterprises. The main finding was that the analyzed resources – the level of labour, size and quality of agricultural land and size of assets were weakly correlated with competitiveness. This observation means that other factors have stronger impact (relational capital, knowhow, managerial competencies, climate, legal issues).

Authors Adamišin, Kotulič, Kravčáková Vozárová (2017) evaluated the economic performance of agricultural entities depending on their legal form in Slovakia. On

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[1]   http://www.agrofarmy.sk/Tmenu/Investicie/investicie2.php

the basis of the testing results, it was found, that business companies show a higher rate of economic success measured by the selected economic indicators.

2   Data and Methods

Data used for the paper were used from database which is prepared by RIEFA Bratislava. We used the data for agricultural companies for period of 2005 – 2015. The companies were divided to commercial companies and agricultural cooperatives and chosen indicators of investment decision-making indicators were applied in agricultural companies in Nitra County.

By land lease the official land prices is determined as capital expenditure and the land lease as a cash income. Cash income is discounted by usage of interest's rates. The interest rate of the loans with maturity over 5 years was used: 4.33 %, 5.29 %, 5.67 %, 5.6 %, 3.37 %, 3.08 %, 3.81 %, 3.48 %, 3.16 %, 3.27 %, and 2.97 %. The land lease is determined as percentage of the official price. To quantify the land lease the following rates from official price was used 0.5 %, 1%, 1.5 %, 2 %, 2.5 % and 3 %. The net present values were calculated as difference of discounted cash incomes (CI) and capital expenditure (CE):

$$NPV = \frac{CI1}{(1+ir)^1} + \frac{CI2}{(1+ir)^2} + \frac{CI3}{(1+ir)^3} \cdots \frac{CIn}{(1+ir)^n} - CE \text{ (1)}$$

Where: NPV – net present value, CI – cash income, CE – capital expenditure, ir – interest rate, n - year

If the indicator reaches positive values the investment is possible to realise. By land purchase we applied the calculation of net present value, internal rate of return, modified internal rate of return, profitability index, payback period and average profitability. Capital expenditure is the official land price and the cash incomes are created from the earning from operating activity decreased about trade margin, depreciation and difference of current assets and short-term liabilities or net working capital (NWC).

Internal rate of return:

$$\frac{CI1}{(1+ir)^1} + \frac{CI2}{(1+ir)^2} + \frac{CI3}{(1+ir)^3} + \cdots \frac{CIn}{(1+ir)^n} = CE \text{ (2)}$$

The indicator shall reach positive values. It represents the interest rate which we are looking for.

Modified internal rate of return =

$$\sqrt[N]{\frac{\sum CI \cdot (1+ir)^{N-n}}{CE}} - 1 \tag{3}$$

The investment is acceptable if the modified internal rate of return reaches lower values as classic quantified internal rate of return.

Ratio between discounted cash incomes and capital expenditure is expressed by profitability index (PI). The investment is acceptable if the values are higher than one.

$$\text{Profitability index} = \frac{\sum \frac{CIn}{(1+ir)^n}}{capital\ expenditure} \tag{4}$$

When or in which time period invested cash will be returned in form of cash incomes is expressed by the indicator payback period which is calculated as follows:

$$\text{Payback period} = \frac{CE}{earning\ from\ operating\ activity + depreciation}$$

Additional ratio is average profitability which divides the sum of earning from the operating activity for followed period and the life cycle of the investment which is multiplied by average land value.

$$\text{Average profitability} = \frac{\sum_{n=1}^{N} Earning\ from\ operating\ activity}{life\ cycle\ .\ \varnothing land\ value} \tag{5}$$

3   Results and Discussion

The most of the land area is leased in Slovakia. The land price in Nitra County is on the level of 2.373 €/ha. Similar values of land prices are in Trnava and Bratislava County it means in the Counties which belong to the Counties operating in favourable natural conditions where the agricultural production is developed and there are good natural conditions for its development. The land lease by usage of percentage (0,5 %, 1 %, 1,5 %, 2 %, 2,5 % a 3 %) from official land price reaches values from 11.86 €/ha to 71.18 €/ha. The land lease is considered as the cash income because it is expected for longer time period. We discounted it by interest rates and calculated discounted cash incomes which are shown in table 1. The value for discounted cash incomes for 0.5 % lease from official land price reaches the lowest value for the interest of 5.67 % and it is 88.67 €/ha which is in comparison with the lowest interest rate 2.97 % less about 12.65 €/ha. Following by increase of used percentage of lease from official land price the value of discounted cash incomes is increasing and the highest values are reached by interest rate of 3 % lease from official price in range from 532 €/ha to 608,1 €/ha.

Table 1 **Calculation of discounted cash incomes for each % of land lease**

%rent/%ir	4,33	5,29	5,67	5,6	3,37	3,08
0,5	94,63	90,30	88,67	88,97	99,28	100,76
1	189,4	180,7	177,4	178	198,65	201,6

%rent/%ir	4,33	5,29	5,67	5,6	3,37	3,08
1,5	284	271	266,1	267	297,9	302,4
2	378,6	361,3	354,8	356	397,2	403,1
2,5	473,3	451,7	443,5	445	496,6	504
3	568	542	532,2	534	595,9	604,7

%rent/%ir	3,81	3,48	3,16	3,27	2,97
0,5	97,11	98,73	100,35	99,79	101,32
1	194,3	197,6	200,8	199,66	202,7
1,5	291,4	296,3	301,1	299,4	304,1
2	388,5	395	401,5	399,2	405,4
2,5	485,7	493,8	501,9	499,1	506,8
3	582,8	592,6	602,3	598,9	608,1

Source: Own calculation.

Net present value created by difference of discounted cash incomes and capital expenditures for each lease percentage from official land prices is shown in table 2. The net present values show the values lower than zero it means that it is not profitable to realise the investment according to these conditions. Logically the less favourable results are for 0.5% lease from price and interest rates when the NPV is in range from -2.272 €/ha to -2.284 €/ha

Table 2 **Quantification of net present value for % of rent in Nitra County**

%rent/%ir	4,33	5,29	5,67	5,6	3,37	3,08
0,5	-2278	-2283	-2284	-2284	-2274	-2272
1	-2184	-2192	-2196	-2195	-2174	-2171
1,5	-2089	-2102	-2107	-2106	-2075	-2071
2	-1994	-2012	-2018	-2017	-1976	-1970
2,5	-1900	-1921	-1929	-1928	-1876	-1869
3	-1805	-1831	-1841	-1839	-1777	-1768

%rent/%ir	3,81	3,48	3,16	3,27	2,97
0,5	-2276	-2274	-2273	-2273	-2272
1	-2179	-2175	-2172	-2173	-2170
1,5	-2082	-2077	-2072	-2074	-2069
2	-1984	-1978	-1972	-1974	-1968
2,5	-1887	-1879	-1871	-1874	-1866
3	-1790	-1780	-1771	-1774	-1765

Source: Own calculation.

As we can see from previous table the negative results of net present value confirm that it is not profitable to lease the land based on these conditions. That is why the amount of cash incomes was modelled for each interest rate so to reach the positive minimal value of net present value.

The cash incomes should be much higher than the real ones to realise the investment with profit. The lowest cash incomes are for interest rate 2.97 % on level 278 €/ha and after for each interest rates are increasing and for interest rate 5.67 % present 318 €/ha. Based on these results the net present value reaches the minimal positive values in range from 2 to 8 €/ha. In the second case the official price was modelled and we detected what should be the official price to reach the minimal positive value of net present value? Capital expenditure should be much lower than the real official land price in this County. The results of calculation for each interest rate and lease are determined by percentage from official land price and are shown in the table 3. Land price should be in range from 88 €/ha to 607 €/ha to reach minimal positive value of NPV what is in comparison with initial price land in this County lower about 1.766 €/ha up to 2.285 €/ha.

Table 3 **Modelled official land price for each % of lease in Nitra County**

%rent/%ir	4,33	5,29	5,67	5,6	3,37	3,08
0,5	94	89	88	88	98	100
1	188	180	176	177	198	201
1,5	283	270	265	266	297	301
2	378	360	354	355	396	402
2,5	472	451	443	444	496	503
3	569	541	531	533	595	604

%rent/%ir	3,81	3,48	3,16	3,27	2,97
0,5	96	98	99	99	100
1	193	197	200	199	202
1,5	290	295	300	298	303
2	388	394	400	398	404
2,5	485	493	501	498	506
3	582	592	601	598	607

Source: Own calculation.

By land purchase we divided the companies on commercial companies and agricultural cooperatives and we compared the results of calculations.

Earning from operating activity after decreasing about gross margin reaches negative value in 2009 and 2010. In 2009 it was -125.3 €/ha and in 2010 it was -13.25 €/ha. In other years the agricultural cooperatives in Nitra County reach profit from this activity. The amount of depreciation which is a part of the earning was increasing from 2005 up to 2009. In 2009 the depreciation reached its maximum in amount of 195.41 €/ha and after this period the amount of depreciation was decreasing. Change of net working capital increased the cash incomes in 2009, 2010, 2011 and 2014. Cash incomes increased from 2005 to 2008. Their development was negatively influenced by loss from operating activity which decreased the cash incomes on the amount of 168.87 €/ha. In 2010 the development of cash incomes was positively influenced by change of net working capital however the cooperatives shown the loss from their activities. Cash incomes reach the level of 382.53 €/ha in 2010. From 2011 we can see decreasing amounts of cash incomes which was caused by negative change of net working capital also in 2012. On the other hand, the highest value of cash incomes is calculated in 2014 in amount of 417.66 €/ha which was positively influenced by development of all indicators which create cash incomes.

Table 4 **Calculation of cash incomes in agricultural cooperatives in Nitra County**

Indicator/year	2005	2006	2007	2008	2009	2010
Earning	19,843	11,729	49,597	88,815	-125,3	-13,25
Depreciation	155,69	155,94	167,25	188,56	195,41	143,58
ΔNWC	26,348	6,760	26,962	21,449	-98,70	-252,2
CI	149,18	160,91	189,88	255,93	168,87	382,53

Indicator/year	2011	2012	2013	2014	2015
Earning	8,736	15,201	5,397	26,332	17,259
Depreciation	121,10	126,33	144,86	153,63	175,4
ΔNWC	-38,01	360,40	12,30	-237,7	237,1
CI	167,85	-218,9	137,95	417,66	-44,44

Source: Own calculation.

Discounted cash incomes for each interest rate reach the range from 1.328 €/ha to 1.514 €/ha. If we decrease the value about the capital expenditure which presents 2.373 €/ha in this County the cooperatives reach negative net present value it means that it is not profitable to realise the investment. The net present value is in the range from -859 €/ha to 1.045 €/ha. This development and indicator`s results influenced also results of profitability index which reaches the values higher than 1 and it means that it is not profitable to realise the investment. Internal interest rate reaches negative values for all interest rates in range from -36.20 % for interest rate 2.97 % to -44.04 % for interest rate 5.67 %. Modified internal return rate shows negative values it means from the point of view of investment realization these values are not acceptable for interest rates 2,97 %, 3,08 %, 3,16 %, 3,27 %, 3,37 %, 3,48 %, 3,81 % a 4,33 %.

Table 5 **Calculation of chosen indicators in agricultural cooperatives in Nitra County**

Indicator/ir %	4,33	5,29	5,67	5,60	3,37	3,08
Discounted CI	1415,8	1352,1	1328,1	1332,4	1484,1	1505,7
CE	2373					
NPV	-957	-1021	-1045	-1041	-889	-867
PI	0,5966	0,5698	0,5596	0,5615	0,6254	0,6345
IRR %	-40,34	-43,02	-44,04	-43,85	-37,46	-36,55
Modif. IRR%	-0,46	0,04	0,24	0,2	-0,95	-1,10
Model. CE	1415	1352	1328	1332	1484	1505
Min. NPV	0,778	0,073	0,049	0,425	0,116	0,735
min. PI	1,0005	1,0001	1	1,0003	1,0001	1,0005
min.IRR	0,05	0,01	0,00	0,03	0,01	0,05

Indicator/ir %	3,81	3,48	3,16	3,27	2,97
Discounted CI	1452,2	1476,0	1499,7	1491,5	1514,1
CE					
NPV	-921	-897	-873	-882	-859
PI	0,6120	0,6220	0,6320	0,6285	0,6380
IRR %	-38,80	-37,80	-36,80	-37,15	-36,20
Modif. IRR%	-0,72	-0,89	-1,05	-1,0	-1,15
Model. CE	1452	1476	1499	1491	1514
Min. NPV	0,193	0,037	0,725	0,518	0,059
min. PI	1,0001	1	1,0005	1,0003	1
min.IRR	0,01	0,00	0,05	0,03	0,00

Source: Own calculation.

Based on results of chosen indicators the investment is not favourable to realize. We modelled the amount of official price which should be lower than the real one by agricultural cooperatives in Nitra County. For interest rate 2.97 % it reaches 1 514 €/ha and consequently the lowest modelled official price is for interest rate 5.67 % in amount of 1 328 €/ha. Based on these official prices the net present values reach minimal positive values in range from 0,037 €/ha to 0,778 €/ha. Profitability index reaches minimal positive values slightly higher than one. Internal return rate reaches also positive values however minimal and low in range from 0,003 % to 0,05 %.

Average profitability is created by sum of earnings from operating activity which reaches 104,4082 €/ha. Total average profitability is 0.80 % in cooperatives in Nitra County.

By real official prices the payback is not reached. Only by modelled amounts of official prices we reached the payback period between years. Payback period between year 8 and 9 is reached by following modelled official land prices: 1 415 €/ha, 1 352 €/ha, 1 328 €/ha, 1 332 €/ha, 1 452 €/ha. By other modelled official prices, the payback period is between 9 and 10 years.

Table 6 **Payback period in agricultural cooperatives in Nitra County**

Year	Earning from OA	Depreciation	Sum	Cumul. sum	CE	Residuum	Payback period
1.	19,8435	155,6868	175,5303	175,5303	1415	105,7252	8,70
2.	11,7286	155,9395	167,6681	343,1984	1352	42,7252	8,28
3.	49,5966	167,2498	216,8464	560,0448	1328	18,7252	8,12

Year	Earning from OA	Depreciation	Sum	Cumul. sum	CE	Residuum	Payback period
4.	88,8145	188,5617	277,3762	837,4211	1332	22,7252	8,15
5.	-125,2487	195,4103	70,1616	907,5827	1484	24,4733	9,14
6.	-13,2523	143,5800	130,3277	1037,9103	1505	45,4733	9,25
7.	8,7363	121,1000	129,8363	1167,7466	1452	142,7252	8,95
8.	15,2013	126,3269	141,5282	1309,2748	1476	16,4733	9,09
9.	5,3969	144,8550	150,2519	1459,5267	1499	39,4733	9,22
10.	26,3322	153,6246	179,9568	1639,4835	1491	31,4733	9,17
11.	17,2594	175,3968	192,6562	1832,1397	1514	54,4733	9,30

Source: Own calculation.

Commercial companies in Nitra County reach profit from operating activity without trade margin in whole analysed period except 2009 when they reached loss in amount of 84,902 €/ha. Positive earnings from operating was the highest in 2008 in amount of 77,893 €/ha in comparison with the first and the last year the earning from operating activity increased only about 3,525 €/ha what we can evaluate positively. Depreciation increased up to 2009 in comparison with 2008 what represents the increase about 69,777 €/ha and after 2009 the trend is unstable. Globally the depreciation increased about 24 % in followed period. The change of net working capital increased the cash incomes in 2005, 2007, 2008, 2009, 2011, 2012, 2014 and 2015 it means that it had impact on positive influence of cash income development. Cash incomes increased about 81,865 €/ha in followed period.

Table 7 **Calculation of cash incomes in commercial companies in Nitra County**

Indicator/year	2005	2006	2007	2008	2009	2010
Earning from OA	26,479	31,183	30,492	77,893	-84,90	26,720
Depreciation	149	163,14	180,54	205,41	218,78	186,70
Change of NWC	-32,93	34,65	-24,59	-31,19	-107,3	317,69
Cash income	208,41	159,67	235,62	314,5	241,19	-104,3

Indicator/year	2011	2012	2013	2014	2015
Earning from OA	12,724	5,102	19,306	41,970	30,004
Depreciation	169,80	188,23	196,17	171,00	184,77
Change of NWC	-62,87	-101,9	27,60	-87,00	-75,50
Cash income	245,39	295,27	187,88	299,97	290,28

Source: Own calculation.

Table 8 **Calculation of chosen indicator of commercial companies in Nitra County**

Indicator/ir %	4,33	5,29	5,67	5,60	3,37	3,08
Discounted CI	1833	1738	1703	1709	1936	1969
CE	2373					
NPV	-540	-635	-671	-664	-437	-404
PI	0,773	0,732	0,717	0,720	0,816	0,83
IRR %	-22,75	-26,76	-28,26	-27,98	-18,41	-17,03
Modified IRR %	1,91	2,35	2,53	2,5	1,48	1,35
Modelled CE	1833	1738	1702	1708	1936	1968
NPV	0,105	0,058	0,472	0,944	0,123	0,934
PI	1,000	1	1,000	1,000	1,000	1,000
IRR %	0,006	0,003	0,028	0,0553	0,0064	0,0475

Indicator/ir %	3,81	3,48	3,16	3,27	2,97
Discounted CI	1888	1924	1959	1947	1982
CE	2373				
NPV	-485	-449	-413	-426	-391
PI	0,796	0,811	0,826	0,821	0,835
IRR %	-20,44	-18,93	-17,41	-17,94	-16,49
Modified IRR %	1,67	1,52	1,38	1,43	1,3
Modelled CE	1887	1923	1959	1947	1981
NPV	0,866	0,889	0,801	0,346	0,595
PI	1,001	1,001	1,000	1,000	1,000
IRR %	0,0459	0,0462	0,0409	0,0178	0,030

Source: Own calculation.

Discounted cash incomes are in range from 1 703 €/ha for interest rate 5.67 % to 1 982 €/ha for interest rate 2.97 %. Capital expenditure is about 2 373 € /ha in Nitra County. Due to the fact that the capital expenditure is lower than discounted cash incomes for all interest rates, the net present value reaches negative unfavourable values in range from -391 €/ha to -671 €/ha. Lower discounted cash incomes as capital expenditure caused that profitability index is lower than one it means that it is not favourable to realize the investment. Internal return rate is negative for all interest rates (in range from -16.49 % to -28,26 %) and it means that it is not profitable to invest. From this reason we modelled official land price to reach minimal positive values of chosen indicators of investment decision. The official price should be lower as the real one and it should be in range from 1 702 €/ha to 1 981 €/ha. Consequently, the net present value reaches minimal positive values from 0,944 €/ha to 0,058 €/ha. The profitability index reaches also minimal positive values equal to one. Internal return rate is in range from 0.0033 % to 0.0553 %. Modified internal return rate is on level from 1.30 % to 2.50 %. Average profitability is around 1.66 % in commercial companies of Nitra County. Total sum of earnings from operating activity without gross margin is 216,9719 €/ha.

Payback period from the point of view of capital expenditure on the level 2.373 €/ha we cannot quantify because the cumulative sum of depreciation and earning from operating activity is lower than capital expenditure. Modelled capital expenditure was used for formula to quantify the payback period which represents for modelled official prices 1 738 €/ha, 1 702 €/ha and 1 708 €/ha between 8 and 9 years and consequently for other modelled official prices between 9 and 10 years.

Table 9 **Payback period of commercial companies in Nitra County**

Year/ Indicator	Earning OA	Depreciation	Sum	Cumul. sum	CE	Residuum	Payback period
1.	26,4793	148,9981	175,4774	175,4774	1833	30,2376	9,14
2.	31,1834	163,1371	194,3206	369,7980	1738	150,7148	8,70
3.	30,4921	180,5374	211,0296	580,8276	1702	114,7148	8,53
4.	77,8935	205,4123	283,3058	864,1334	1708	120,7148	8,56
5.	-84,9019	218,7751	133,8732	998,0066	1936	133,2376	9,63
6.	26,7200	186,7000	213,4200	1211,4266	1968	165,2376	9,78
7.	12,7240	169,8000	182,5240	1393,9506	1887	84,2376	9,40
8.	5,1022	188,2324	193,3346	1587,2852	1923	120,2376	9,56
9.	19,3058	196,1714	215,4772	1802,7624	1959	156,2376	9,73
10.	41,9699	171,0021	212,9720	2015,7344	1947	144,2376	9,68

Year/ Indicator	Earning OA	Depre- ciation	Sum	Cumul. sum	CE	Residu- um	Payback period
11.	30,0035	184,7737	214,7772	2230,5116	1981	178,2376	9,84

Source: Own calculation.

4   Conclusion

The soil is important production factor which is linked with the agriculture. The agriculture is one of the most widespread activity in Nitra County area because of its very good natural and climate conditions for growing crops, expand the agricultural production because of the highest volume of arable land (405 743 ha) among all regions of Slovakia. In the paper we dealt with the application of chosen methods of investment decision efficiency by the decision of the companies if to purchase or lease the land. By land lease we found out that the net present value reaches negative results. In order to recommend the investment, the net present value should be at least positive and the amount of capital expenditure should be much lower in Nitra County. By land purchase from the point of view of commercial companies and agricultural cooperatives and in comparison, with calculated results we can say that the amount of the cash incomes increased in commercial companies from 2005 to 2015 and vice versa in agricultural cooperatives decreased to negative value. Net present value reaches in both legal forms of companies' negative value however the lower value are evidenced by the commercial companies. Profitability index is unfavorable – it is lower than 1 in both legal forms. Internal return rate reaches similar trend, the negative values in both legal forms but lower by the commercial companies. Modified internal return rate reaches positive values during all years by commercial companies. Average profitability is higher by commercial companies on the level of 1.66 %. The payback period is on similar level 8-10 years by both legal forms

Acknowledgements

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ORGANIC FARMING DEVELOPMENT FOLLOWING THE ACCESSION TO THE EUROPEAN UNION: THE POLISH EXPERIENCE

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Abstract

This paper discusses the changes in Polish organic farming, with particular focus on changes in the number and area of organic farms, area structure and processing volumes. The timeframes of this study are the period of the Poland's membership in the European Union, i.e. 2004-2016. The analysis was based on IFOAM data and Polish organic agriculture reports published biannually by the General Agricultural and Food Quality Inspection (GIJHARS). This paper notes that the 2004-2016 period witnessed a quantitative growth of organic farming, as reflected by a dynamic increase in the area of organic farmland and in the number of farms. In the last three years, a decline in the area of organic agricultural land has been recorded due to changes in the conditions of environmental payments. In 2014-2015, a large part of farms discontinued their organic farming activities due to lack of production activities and market links. In Poland, despite a highly dynamic increase in organic farmland area and in the number of farms, the organic production and processing volumes continue to be low.

Keywords: *European Union, Poland, organic farming, organic production, changes.*

JEL classification: E23, Q01, Q57, Q 32, Q56

1   Introduction

Polish organic farming has been among the fastest growing sectors of food economy. This is reflected by the high growth rates (10-20%) of both the number of organic farms and of organic farmland area, as seen for more than a decade. This is how agricultural producers respond to growing demand from consumers who become increasingly interested in organic food as their incomes and health awareness grow. In 2015, the value of the Polish organic food market was estimated at around PLN 770 million, and went beyond PLN 1 billion in 2017. According to the 2014-2020 Framework Action Plan for Organic Food and Farming in Poland, that value is supposed to reach at least EUR 210 million. The average spending of a Polish consumer on organic food is EUR 4, much less than in the case of Danish or German consumers who spent, respectively, EUR 197 and EUR 105.9 in 2015 (Organic in Europe, 2016). It should be expected that the expenditure on organic food will follow a stronger growth trend as the income situation of Polish consumers improves. Organic food represents 0.5% (as at 2016) of the Polish food market which is a small share compared to other EU countries where it ranges from 3% to 8%. In the future, the organic farming model and the organic products market are highly likely to continue their growth because, on one hand, the food economy demonstrates an enormous (and not fully exploited) potential in this area, while on the other hand, demand pressure for organic food increases as the society becomes wealthier.

The development of organic farming following Poland's accession to the European Union has been the subject of many economic studies, focusing on four basic problems: 1/ organic farming vs. conventional farming in the context of sustainable development (Kociszewski, 2013, Komorowska, 2014), 2/ economic efficiency of organic farms (Nachtman, 2006, Nachtman, 2009, Nachtman, 2012, Komorowska, 2012), 3/ financial support for organic farming (Kondratowicz-Pozorska 2014, Łuczka-Bakuła 2013), 4/ development trends of organic farming in Poland (Golinowska 2013, Drabczyńska and Wrzesińska-Kowal, 2015, Komorowska, 2015). This paper addresses the fourth research topic listed above.

The previous studies indicate that the development of certified organic farming in Poland may be split into three periods with various growth rates of basic indicators.

The 1st stage extends from 1990 to 1997. Established in 1989, EKOLAND, the first Polish certification body for organic farming, conducted the first inspection in 1990, resulting in the certification of 27 farms. In 1993, organic farms were also certified by the Polish Organic Farming Association and by SKAL, a Dutch organization. In that period, organic farmers did not access any financial support from the

state budget; the number of organic farms increased from 27 to 324 in 1997. Farms were run by farmers demonstrating high levels of ecological awareness, strongly committed to environmental protection in the agriculture and rural areas.

The 2nd stage extended from 1998 to 2003. In 1998, for the first time, the organic agriculture sector was provided with financial support in the form of a partial reimbursement of farm inspection costs (the subsidy was granted to certification bodies). In 1999, agricultural area payments became available to operators of organic farms or farms under conversion from conventional to organic. In 1999, the amount of payments disbursed to 555 organic farms was PLN 674,273 which means an average payment of PLN 1,215 (EUR 300 approximately) per farm. That period marked the adoption of the organic farming act which governed the conditions for organic production and processing, defined the farm inspection and certification system, and specified the principles for product trading and labeling (Organic Farming Act of March 16, 2001).

In that period, organic farming was growing at a very slow rate because of poor profitability of organic production and insufficient organization of the organic product market. The fragmented output of the very few organic farms was sold in local markets based on traditional distribution channels. Despite favorable agri-technical conditions in the Polish agricultural sector (including the ease of farming conversion due to low quantities of chemicals used), the production volume failed to meet the growing demand. From 1998 to 2003, the number and area of organic farms more than quadrupled. The area of organic farmland increased to 49,928 ha in 2003, reaching 0.3% of the total agricultural land area. The number of organic farms increased from 417 in 1998 to 2,286, representing 0.11% of all agricultural holdings.

The 3rd stage covers the period of Poland's accession to the European Union (2004). This was a breakthrough for the development of Polish organic farming as the farmers became eligible for instruments available under the common agricultural policy and the national agri-environmental program. The support mechanisms helped improving the profitability of organic agricultural producers (Kodratowicz-Pozorska, 2014).

2   Data and Methods

The paper discusses the changes in the Polish organic farming with particular emphasis on increase in organic utilized agricultural area, number of farms, agricultural area structure and volume of processing. The characteristic feature of the organic farming development in Poland as well as barriers limiting organic food supply growth on domestic market were also determined. The paper attempts to find the answer the question about the reasons for the phenomenon of organic

farming in Poland consisting in sharp increase of the organic farms and area after 2004. The time range of the study includes the period of Poland's accession to the EU, i.e. years 2004-2016. The analysis was conducted based on the IFOAM data and reports on the state of organic farming in Poland published every two years by the General Agricultural and Food Quality Inspection (GIJHARS).

While elaborating the empirical data the basic methods of descriptive statistics, such as mean values, dynamics indicators and structure indicators were applied. These indicators were used in the analysis of changes between 2004 and 2016 in number of farms and organic utilized agricultural area (dynamics indicators), in the analysis of organic agricultural area structure (structure indicators) as well as in the analysis of the average area of the organic farms (mean values).

3 Results and Discussion

In 2016, thirteen years after Poland's accession to the EU, there were 22,435 organic farms with a total organic farmland area of 536 579 ha (Table 1).

Table 1 **Number of organic farms and organic farmland area in Poland in 2004-2016**

Year	Number	Area (ha)	Average area of organic farms
2004	3,760	82,730	22.0
2005	7,183	166,300	23.2
2006	9,189	228,009	24.8
2007	11,870	287,528	24.2
2008	14,896	314,921	21.1
2009	17,091	416,261	24.4
2010	20,582	519,068	25.2
2011	23,449	605,520	24.5
2012	25,944	661,687	25.8
2013	26,598	669,969	25.2
2014	24,829	657,902	26.5
2015	22,277	580,730	26.1
2016	22,435	536,579	23.9

Source: Główny Inspektorat Jakości Handlowej Artykułów Rolno-Spożywczych. (2005). Rolnictwo ekologiczne w Polsce w 2004 roku. Warszawa; Główny Inspektorat Jakości Handlowej Artykułów Rolno-Spożywczych. (2017). Raport o stanie rolnictwa ekologicznego w Polsce w latach 2015-2016. Warszawa.

The highest increase in the area of organic farmland was reported in 2009-2010, with an increase by around 100,000 ha compared to previous year. Poland has the fifth largest area of organic farmland and the sixth largest number of organic farms in the European Union. From 2004 to 2016, the area of organic farmland increased by 548.9%, from 82,700 ha to 536,600 ha (Figure 1). Note that 2014 marked the first decrease in the area of organic farmland since the accession to the European Union. The downward trend continued in 2015 and 2016.

Figure 1 **Growth in organic farmland in Poland between 2004 and 2016 (compared to the previous year, in ha)**
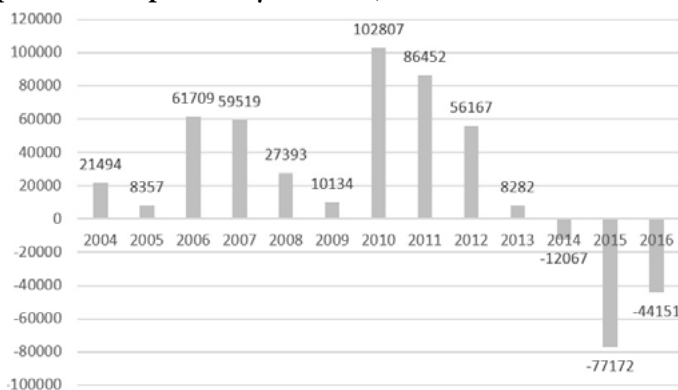
Source: Author's own calculation based General Agricultural and Food Quality Inspection (2005). Organic farming in Poland in 2004. Warsaw; General Agricultural and Food Quality Inspection (2017). Report on the condition of Polish organic agriculture in 2015-2016. Warsaw.

The number of organic farms followed a similar evolution, growing from 3,760 in 2004 to 22,435 in 2016 (an increase by 496.7%) (Figure 2). The largest number of organic farms (26,598) was reported in 2013. In 2014 and 2015, that number declined to 24,829 and 22,277, respectively.

Figure 2 **Growth in number of organic farms in Poland between 2004 and 2016 (compared to the previous year)**
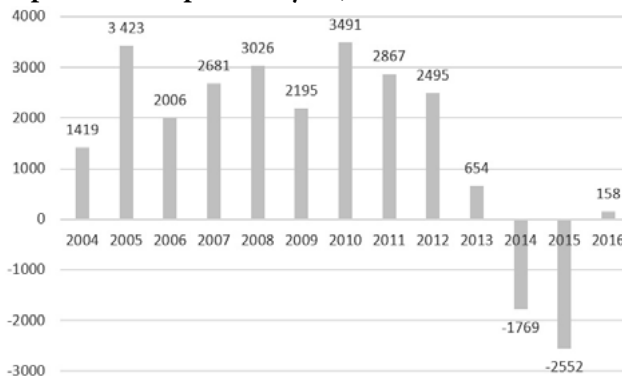
Source: Author's own calculation based on General Agricultural and Food Quality Inspection (2005). Organic farming in Poland in 2004. Warsaw; General Agricultural and Food Quality Inspection (2017). Report on the condition of Polish organic agriculture in 2015-2016. Warsaw.

The dynamic growth of organic farming, recorded since 2004, is strictly related to Poland's accession to the European Union (Łuczka, 2016). The accession was fundamental for the development of organic farming for three essential reasons. First of all, it contributed to aligning the Polish legislation applicable to organic farming and its products with the European Union's legal regulations. The day Poland joined the EU marked the adoption of the organic farming act aligning the national legal system with Union standards (Organic Farming Act of April 20, 2004). Currently, the legal act which prevails over national law is the Council Regulation (EEC) No. 2092/91 of June 24, 1991 governing the conditions for production, processing, inspection system and distribution of organic food. Secondly, it provided the Polish producers with better opportunities of participating in foreign trade in organic products in the Union market. Thirdly, the accession to the European Union contributed to increasing the level of financing for organic agriculture. This helped stimulating its dynamic growth. From 2004, the Polish agricultural sector has been covered by the Common Agricultural Policy and by financial support provided under the 2004-2006, 2007-2013 and 2014-2020 Rural Development Programs. The level of per-hectare payments for organic farming was considerably higher than in the case of other measures. The amount of support for organic farming varies depending on crop type and on whether the farm's conversion process is in progress or complete. During the two-year conversion period, farmers are provided with higher subsidies. In 2004, the per-hectare payment ranged from PLN 188 (EUR 45/

ha) to PLN 260 (EUR 63/ha). Since 2007, the payments have been extended to cover orchards and herbal farms. At the end of the study period, in 2016, the subsidy rates ranged from PLN 428/ha (EUR 103/ha) for permanent grassland (during the conversion period and thereafter) to PLN 1,882/ha (EUR 453/ha) for basic orchards under conversion from conventional to organic.

Table 2 presents the structure of organic farms grouped by area in 2004 and 2016. Both in 2004 and 2016, farms with an area of 10-20 ha had the largest share (around 27%). The smallest share was held by large farms with an area beyond 100 ha (4.6% and 3.6%, respectively). Over the study period, the highest loss of share was reported in the farms with an area of 5 to 10 ha (from 25.6% to 20.4%). In 2016, the average area of organic farms increased was 26.06, which means an increase by 4.6 ha compared to 2004. In 2016, the average area of organic farms was greater than that of conventional farms (10.56 ha) by 15.50 ha, approximately.

Table 2 **Area structure of Polish organic farms in 2004 and 2016.**

Specification	2004		2016	
	Number	Share (%)	Number	Share (%)
Up to 5 ha	699	18.6	4,535	20.3
5-10 ha	962	25.6	4,570	20.4
10-20 ha	1,009	26.8	5,917	26.5
20-50 ha	668	17.8	4,653	20.8
50-100 ha	247	6.6	1,878	8.4
Over 100 ha	175	4.6	816	3.6

Source: General Agricultural and Food Quality Inspection (2005). Organic farming in Poland in 2004. Warsaw; General Agricultural and Food Quality Inspection (2017). Report on the condition of Polish organic agriculture in 2015-2016. Warsaw.

In Poland, organic farms are highly dispersed, and run small-scale production operations which result in interrupted supplies. This situation changed considerably following the accession to the EU. Until 2004, most of the farms were located in regions with a fragmented agrarian structure. Currently, over half of them are located in regions where large-scale farms are predominant.

In Poland, the decision to shift towards organic farming is usually made by farms with lower quality soils of a lower valuation class, located in less-favored areas. These are lower-yield farms which produce smaller quantities of food. A characteristic feature of Polish organic farming is the extensive production model (Jończyk, 2014) with a share of grassland considerably above the general

countrywide level, and with a smaller livestock population (Nachtman, 2012). In 2016, grassland and pasture represented 25.6% of organic farmland while the share of cereals was 18.9%. In the 2004-2016 period, organic farms demonstrated relatively low production volumes of basic products and relatively small livestock populations (Table 3). The respective growth rates were below the agricultural area growth rate. In 2016, production of cereals, fruits and vegetables totaled 147,800 tons, 57,900 tons and 38,100 tons, respectively. Over the study period, the population of dairy cows grew by 52% while that of pigs decreased by 62.9% (in 2016, there was only 11,000 dairy cows and 4,400 pigs for fattening). In turn, as regards poultry farming, there was a considerable growth in the population of broilers (441%) and laying hens (293%).

Table 3 **Production of selected vegetable products and livestock population in organic farms over the 2004-2016 period**

Specification	2004	2016	2004-2016 growth rate (%)
Vegetable production (tons)			
Cereals	25,870.5	147,830.4	571.4
Potatoes	17,234.7	17,902.2	103.9
Fruits	12,505.5	57,941.4	463.3
Vegetables	*	38,120.4	-
Livestock (units)			
Beef cattle	*	8,433	-
Dairy cows	7,788	11,864	152.3
Broilers	6,714	36,337	541.2
Laying hens	45,722	179,764	393.2
Porcine animals	12,004	4,449	37.1
Ovine animals	12,192	19,474	159.7
Caprine animals	1,958	3,519	179.7

*No data
Source: same as in Table 2.

Low vegetable and animal production volumes of organic farms are also confirmed by research on sample farms covered by FADN (Table 4). Accordingly, in 2010, livestock density per hectare of agricultural land was twice lower in larger farms than in smaller ones (0.38 and 0.76, respectively). Low livestock density levels makes it difficult for many farms to keep the balance between farm-produced feed and natural fertilizers. As the agricultural area grows, so do the amounts of aid

for organic farms. Therefore, aid (rather than production activities) is what helps organic farms achieving income levels comparable to those earned by conventional farms. In 2010, the share of aid in incomes of smaller and large farms was 70-80% and 94-102%, respectively (Nachtman, 2012). This shows that organic farming incomes depend upon subsidies (Nachtman, 2009). There is a reason to believe that in many cases, aid is the key motive behind engaging in organic farming. However, in the future, the principles for the allocation of organic farming aid would need to be changed to make it available to farmers who, in addition to complying with environmental objectives, also deliver organic food to the market.

Table 4 **Structure of land utilization and selected economic indicators of organic farms in 2010**

Specification	Farms grouped by area (ha)				
	5-10	10-20	20-30	30-50	>50
Land utilization structure (%)					
Cereals	32.1	33.3	25.6	31.6	32.8
Other crops	11.6	8.0	10.6	9.3	4.3
Orchards	10.8	9.5	2.5	3.5	8.5
Legume crops	41.1	42.9	59.0	51.6	51.4
Livestock density	0.76	0.56	0.60	0.46	0.38
LSU/forage area (ha)					
Grazing livestock density per hectare of forage area	1.20	0.93	0.72	0.57	0.41
Selected economic indicators					
Vegetable production value per ha of agricultural land	2053	2113	853	1650	624
Direct costs (PLN per ha of agricultural land)	1053	868	593	934	767
Share of subsidies in farming incomes (%)	89.0	73.2	90.4	101.6	93.9

Source: own study based on Nachtman, G. (2012). *Efektywność ekonomiczna gospodarstw ekologicznych w porównaniu do konwencjonalnych w 2010 roku*, Zagadnienia Doradztwa Rolniczego, No. 2, 51-65.

In the study period, the dynamic growth in the number of organic farms and farmland area was not accompanied by a corresponding increase in the marketable production and processing volumes. This was caused by several reasons, including the regulations (applicable until 2014) setting out the principles for organic farming support which was also available to farms without marketable

production. Because organic production was not required to be delivered to the market, agri-environmental programs attracted many farmers interested solely in accessing funds rather than in pursuing agricultural objectives and engaging in marketable production activities. That group, referred to as "subsidy farmers" in the literature, was at the origin of many dysfunctions in the organic farming sector, and contributed to a negative perception of the related support in the context of the purposefulness of public spending. The above had multiple consequences, including the lack of a positive correlation between the growing number of farms and the organic production volume. According to a study among 200 organic farms, commissioned in 2011 by the Ministry of Agriculture and Rural Development, one in three farms did not run any marketable production activities or reported a share of marketable production of up to 20% (results of the 2011 organic farming survey). The average area of farms with high shares of marketable production did not exceed 15.5 ha (compared to 20.7 ha in the case of farms without marketable production). Contributing to high shares of marketable production was the breeding of dairy cows, pigs for fattening and poultry. In turn, a high share of grassland and pastures was characteristic for farms with low shares of marketable production.

Because of low levels of marketable production in organic farming, a new regulation was adopted on March 12, 2014, imposing a requirement to obtain crops from land under organic farming, and a requirement to market at least 50% of the organic farming production volume (Regulation of the Ministry of Agriculture and Rural Development of March 12, 2014). In response to the new requirements, some farmers made a decision to discontinue their participation in the agri-environmental program and to ultimately quit organic farming. This was reflected by the decreasing number of organic farms and by the decline in the area of organic farmland.

The reason for such situation may also be the fact that significant part of the organic farms does not deliver goods on the market, because of the problems of the distribution sphere, which does not ensure efficient flow of goods. Therefore, mainly direct selling and specialist shops dominate in distribution of organic food, which is typical for countries with low level of market development. In Western European countries the organic market has moved from the niche to the mainstream market and the organic distribution concentrates in supermarkets, which allows to apply lower prices for organic food and improves its accessibility (Smoluk-Sikorska, 2017).

Another weakness of organic food economy is not only the low supply of organic raw materials but also the insufficient level of processing. While the processing volumes follow a steady upward trend, processing facilities are dispersed

and misadjusted to the growing demand for organic food. Low levels of processing operations adversely affect production profitability because they are one of the reasons why some of the raw materials from organic farms are sold as conventional products, which contradicts the objectives of organic farming. Note also that only some of the 546 certified processing facilities reported production activities in 2016. The condition of the processing sector is reflected by the fact that in 2016, the volume of processed vegetables and fruits was 3.8 million tons; the respective figures for meat and fish, milk and cheese, and cereal milling were 154,000 tons, 149,000 kg and 9,000 tons. These are very small quantities, all the more so since vegetables, fruits and cereals are the most highly demanded categories of organic food.

In Poland, low processing volumes result from a high dispersion of organic farms. Polish organic processing plants fail to fully exploit their production capacity because of the restricted ability to purchase local organic raw materials. According to studies conducted in a group of 75 processing plants active in conventional and organic processing in parallel, the share of organic processing in the production volume was 10% in every second plant (Łuczka, 2016). Insufficient quantities of raw materials were cited as the reason for the low supply of processing services by 70% of producers surveyed. One of the ways to improve the operation of the resource base, considering the important distances between organic farms, is the horizontal integration of agricultural producers, including as producer groups. The lack of integration with other links of food economy does not only weaken the market position of farmers but also hampers the operation of the supply and sale side of the organic food market (Pawlewicz, 2014, Pawlewicz and Szamrowski, 2012). However, organic farmers show little interest in creating producer groups. In 2016, only 7 of them existed. The lack of interest from the producers in enhanced forms of cooperation suggests there is an urgent need for relevant education measures to be taken by agricultural consultancy centers.

4   Conclusion

Based on the above analysis, several conclusions may be drawn concerning the production and processing sectors of Polish organic farming after the accession to the European Union.

1. In the period of Poland's accession the European Union the dynamic growth of the organic farms (by 497%) and organic utilized agricultural area (by 549%) took place.

2. The high dynamics of organic farming growth was not accompanied by a corresponding increase in production volumes of organic food. This resulted from

the financial support system, which was not related to the production amount of farms. As a consequence, the market supply was insufficient.

3. The insufficient supply of organic food in Poland reveals the immaturity of the organic food market. Measures need to be taken on the production side to stimulate the growth of supply and further the farmers' interest in selling their output in the market.

4. The poor development of organic production and processing in Poland is the reason why the relevant research needs to be continued and intensified in order to identify the development barriers and specify the degree and nature of relationships with the organic food market. The existing studies on these matters fail to provide a basis for a more in-depth analysis of reasons behind the insufficient supply of organic food despite the increasing demand vacuum.

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HEALTHCARE AND THE SUSTAINABLE DEVELOPMENT OF WESTERN POLAND DISTRICTS

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Abstract

The purpose of this paper is to identify the relationships between the level of sustainable development of Western Poland districts and the material and human resources of healthcare based on 2015 data. The study covered 112 districts (14 municipal districts and 98 land districts) included in two territorial units for statistics (NUTS 1), i.e. the south-western macro-region (Dolnośląskie and Opolskie voivodeships) and the north-western macro-region (Lubuskie, Wielkopolskie and Zachodniopomorskie voivodeships). Due to multidimensional nature of the categories under consideration, canonical analysis was used which means multiple linear regression generalized for two sets of variables. The statistical significance of analyzed canonical variables was assessed with the Wilks' lambda test. The canonical analysis included the calculation of canonical correlations, total redundancy and variances extracted.

Keywords: *canonical analysis, health, sustainable development*

JEL classification: *C19, I15, Q01*

1   Introduction

Obvious interactions take place between humans and their surroundings (environment) - on one hand, people develop the environment while on the other, the environment has a consistent influence on them. In the last decades of the 20th century, there was an increase in the number of people diagnosed with chronic allergic disorders, dermatology diseases or respiratory diseases. Therefore, the researchers started to discover the impact of the place of residence and external

environment on human health. Due to significant, increasingly stronger negative health effects of environmental pollution in Europe, at the 1994 Helsinki conference, the World Health Organization adopted the European Environment and Health Action Plan (World Health Organization, 1994) setting out the frameworks for the development and implementation of national and local environment and health action plans (including in Poland). Today, various strategic documents (whether local, regional or national) include frequent references to the sustainable development paradigm. In that context, it seems that particular importance should be attached to actions aimed at improving the population's health. Human health and healthcare delivered in human environment are the basic indices of the standards of living.

The purpose of this paper is an attempt to show the relationships between the level of sustainable development of Western Poland districts and the material and human resources of healthcare. Due to multidimensional nature of the categories under consideration, a canonical analysis was performed. The main criterion for selecting the variables was their completeness and availability for all items under consideration in 2015. The source of data related to specific subsystems of sustainable development was the Local Data Bank of the Central Statistical Office.

1.1 The essence of public health in the context of sustainable development

Nowadays, activities consistent with the sustainable development concepts have become one of the main priorities for European countries and for specific local government units. In this context, note that according to "A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development" (Commission of The European Communities, 2001) adopted in 2001 in Gothenburg, "economic growth, social cohesion and environmental protection must go hand in hand". A milestone for sustainable development was the UN Conference on Environment and Development organized in Rio de Janeiro in June 1992. An important outcome of the Earth Summit was AGENDA 21, a document setting out the directions for actions promoting sustainable development. From the perspective of these considerations, it is important to note that a separate chapter (Chapter 6. Protecting and Promoting Human Health) of that document was dedicated to health (environmental) issues. It was assumed that actions under AGENDA 21 must address the primary health needs of the world's population, since they are integral to sustainable development ("health and development are intimately interconnected"). The basic objectives included: meeting primary health care needs, particularly in rural areas; control of communicable diseases;

protecting vulnerable groups (particularly infants, youth, women, indigenous people and the very poor); meeting the urban health challenge; reducing health risks from environmental pollution and hazards (United Nations, 1992).

In accordance with the classic definition of health adopted in 1946 by the World Health Organization (WHO) "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1946). Meanwhile, public health is defined as "the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society" (World Health Organization, Regional Office for Europe, 2014). The essential public health functions include (PAHO/WHO, 2008): monitoring, evaluation and analysis of health status; surveillance, research, and control of the risks and threats to public health; health promotion; social participation in health; development of policies for public health planning and management; strengthening of public health regulations; evaluation and promotion of equitable access to necessary health services; human resources development and training in public health; quality assurance in health services; research in public health; reduction of the impact of emergencies and disasters on health. The identification of the environmental conditions' impact on the population's health contributed to identifying a new field of public health: environmental health. As defined by the World Health Organization in 1993, „Environmental health comprises of those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially affect adversely the health of present and future generations." (after: Gosselin et al., 2001). According to the definition by NEHA (*National Environmental Health Association*), environmental health means protection against environmental agents that may adversely affect human health or ecological balance, as necessary for ensuring human health and quality of the (natural and man-made) environment in the long term (after:Spellman & Stoudt, 2013).

Human health is impacted by environmental agents (at an estimated level of 15-20%), genetic predisposition (20%), healthcare (10%) and lifestyle (50%) (Janikowski 2010, p. 79). According to the National Institute of Environmental Health Sciences (NIEHS) "environmental agents" include[2]:

- climate change, water and air pollution, hazardous waste,
- nutrients,
- lifestyle (cigarette smoke, use of cell phones),

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[2] Cf. http://www.niehs.nih.gov/health/topics/agents/ (accessed on 10.12.2017).

- physical agents (e.g. electric and magnetic fields),
- chemical agents (e.g. dioxins, mercury),
- biological agents (e.g. endocrine disruptors).

It is very clear that the above definitions of "environmental health" include both elements of the classic definition of health and a reference to inter-generative justice and sustainable development. Therefore, it seems justified to analyze the relationship between levels of sustainable development of specific local government units and the material and human resources of the population's healthcare system. In this context, note that in May 1998, based on the abovementioned AGENDA 21, the WHO Regional Office for Europe created a document named "Health 21: health-for-all policy for the twenty-first century". According to its assumptions, „the improvement of the health and well-being of people is the ultimate aim of social and economic development" and "good health is fundamental to sustainable economic growth. Intersectoral investment for health (...) has wider benefits, contributing in the long term to overall economic and social development. Investment in outcome-oriented health care improves health and identifies resources that can be released to meet the growing demands on the health sector" (World Health Organization, 1998, p. 4-8).

2 Data and Methods

The canonical analysis covered 112 districts (14 municipal districts and 98 land districts) included in two territorial units for statistics (NUTS 1), i.e. the south-western macro-region (Dolnośląskie and Opolskie voivodeships) and the north-western macro-region (Lubuskie, Wielkopolskie and Zachodniopomorskie voivodeships). As at the end of 2015[3], that territory had a population of 10 104 098 and an area of 96 065 sq. km (over 30% of the country's total area). In the territory under consideration, the Sulęcin district (with a population of 35 596) and the city of Wrocław (635 759) are the last and the first district by population, respectively. The Poznań district (1 900 sq. km) and Leszno district (32 sq. km) have the largest and smallest area, respectively.

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[3] Data from the Local Data Bank of the Central Statistical Office (https://bdl.stat.gov.pl/BDL/start).

As a result of a relevant and formal[4] analysis of variables, 41 sub-indicators were proposed which reflect the levels of sustainable development split into 4 dimensions (cf. Borys, 2011; Central Statistical Office, 2011):

■ the environmental dimension: E1: municipal and industrial wastewater treated vs. total volume of wastewater; E2: share of population served by treatment plants in the total population; E3: afforestation rate; E4: particulate matter emissions by particularly noxious plants per 1 sq. km; E5: emission of gaseous pollutants by particularly noxious plants per 1 sq. km; E6: area of walking and leisure parks per 1 sq. km; E7: share of green areas in the total area; E8: water consumption per capita; E9: share of recycled waste in the total annual volume of waste;

■ the social dimension: S1: population density; S2: population growth rate per 1000 population; S3: infant deaths per 1000 live births; S4: graduates of junior high schools per 1000 population; S5: share of dwellings equipped with central heating; S6: share of dwellings served by gas networks; S7: number of books per 1,000 population; S8: library members per 1000 population; S9: population per library; S10: population per cinema seat; S11: number of dwellings per 1000 population; S12: number of kindergarten pupils per 1000 children aged 3 to 5; S13: number of passenger cars per 1000 population; S14: traffic accidents per 100000 population;

■ the economic dimension: G1: employees per 1000 population; G2: share of employees in the working-age population; G3: hard-surfaced municipal roads in the district per sq. km; G4: sewage network length per sq. km; G5: water supply network length per sq. km; G6: share of commercial enterprises in the total number of operators registered in the REGON system; G7: permanent marketplaces per 1000 population; G8: hotel beds per 1,000 population; G9: social foundations, organizations and associations per 1,000 population; G10: industrial output sold per capita[5]; G11: CAPEX in enterprises per capita;

■ the institutional dimension: I1: district's budget income per capita; I2: expenditure per capita; I3: sports expenditure per capita; I4: housing management expenditure per capita; I5: culture and national heritage protection expenditure per capita; I6: education expenditure per capita; I7: share of municipal councilors with a tertiary education degree.

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[4]   The relevant criterion means the diagnostic features must capture the most important (rather than marginal) properties of objects covered by the analysis, must be unequivocally and strictly defined, and logically interrelated. In turn, the formal criterion requires that the diagnostic features be measurable so as to enable expressing their level numerically, cf. Podogrodzka, 2011.

[5]   The data relates to enterprises and operators with more than 9 employees.

Considering the data completeness and availability criterion, 6 variables were used to assess the concentration of material and human healthcare resources in specific districts: H1: primary health centers per 10000 population; H2: medical practices per 10000 population; H3: population served by 1 pharmacy; H4: doctors per 10000 population; H5: nurses and midwives per 10,000 population; H6: general hospital beds per 10000 population.

To present the dependencies between the sets of variables describing the level of sustainable development of Western Poland districts and the material and human healthcare resources, a canonical analysis was performed. The use of an "ordinary correlation analysis" (e.g. Pearson correlation formula) between pairs of variables seems insufficient as it fails to address the relationships inside the sets of explained and explanatory variables. The canonical analysis means multiple linear regression generalized for two sets of variables, and enables answering the following question: what is the extent of a simultaneous impact of the entire set of independent variables on the entire set of dependent variables? With the canonical analysis, the assessment of dependencies between two initial sets of variables boils down to analyzing the relationships between two new types of variables (referred to as canonical variables) which are weighted sums of the first and second set. The weights are selected so that the two weighted sums are maximally correlated with each other. Thus, the canonical analysis transforms the vectors of initial variables into new generated vectors of canonical variables so as to maximize their mutual correlation (Tadusiewicz et al., 1993; Ter Braak, 1990; Hardoon et al., 2003; Naylor et al., 2010; Ribeiro et al, 2016). When considering two linear combinations,

$x = x^T w_x$ and $y = y^T w_y$

the objective is to maximize the following expression (cf. Weenink, 2003; Hardoon et al., 2003):

$$r_1 = \frac{\left(w_x^T R_{xy} w_y\right)}{\sqrt{\left(w_x^T R_{xx} w_x w_y^T R_{yy} W_y\right)}} \quad (1)$$

with: R_{xx} - correlation matrix for explained variables; R_{yy} - correlation matrix for explanatory variables; R_{xy} - correlation matrix for both types of variables; w_x, w_y - weights for first-type and second-type canonical variables; r_1 - canonical correlation coefficient.

Maximum correlation is sought based on the indeterminate Lagrange multipliers method.

3   Results and Discussion

In both analyzed sets, fragmentary variables taken into account are indicative, rather than values of absolute character. In addition to the relevant and formal criterion, purely statistical criteria were also used when selecting the variables. An assumption was adopted that the features with a coefficient of variation below the critical threshold value of 10% (fixed arbitrarily) will be eliminated from the set of potential variables. Beside variation, an important criterion for the selection of variables is their mutual correlation (the capacity criterion). As two highly correlated variables deliver similar information, it is recommended to eliminate one of them. To verify the information value, the inverse correlation matrix (a method for the discrimination of features depending on the correlation matrix entries) was used. The inverse correlation matrix was calculated for each thematic subgroup of potential diagnostic variables. As the next step, where necessary, the variable with the highest diagonal entry, above the threshold set arbitrarily (15), was eliminated. The set of diagnostic features referring to the sustainable development levels of Western Poland districts was reduced because of low differentiation degree by eliminating E1 and S5. Also, considering the capacity criterion, G2 and I2 were eliminated. Other variables (in both sets under consideration) were used in further steps of the analysis because of their high discriminative and information capacity.

One of the main requirements imposed by methods of multidimensional statistical analysis on diagnostic variables is their comparability. Therefore, the variables were normalized with the use of the classical standardization procedure.

The first step of the canonical analysis is to identify the canonical weights for the first pair of variables which contributes the most to explaining the relationships between the sets of explained and explanatory variables. All canonical variables are generated as pairs which are then ordered by value of canonical correlation in descending order. Because canonical variables of a specific type are not mutually correlated, the sum of squared canonical correlation coefficients for all pairs of variables considered shows the extent to which the variation of explained variables are explained by explanatory variables.

The canonical analysis requires that the variables follow a normal distribution. The normality of the distribution of sub-variables considered was assessed based on normal distribution graphs and the Shapiro–Wilk test. If some variables fail to follow the normal distribution, the Box–Cox transformation is used to make an approximation of the normal distribution.

The starting point for the proper canonical analysis is to determine the values of canonical weights which, as mentioned earlier, are set so as to maximize the

correlation between subsequent pairs of canonical variables. The number of all canonical variables is equal to the minimum number of variables in any of the analyzed sets (in this case, 6). It is important to clearly specify the number of first pairs of canonical variables to be used in the in-depth analysis. For that purpose, the Wilks' Λ (Wilks' lambda) significance test of canonical correlation was used. To verify the significance of pairs of canonical variables, the test statistic may be used for a set of s-k variables as per the following formula (Panek & Zwierzchowski, 2013):

$$\lambda_k = \prod_{l=k}^{s}\left(1 - r_l^2\right) \text{ (2)}$$

with: s - number of canonical variables.

The test statistic follows the Wilks' Λ probability distribution with the following number of degrees of freedom:

$$d_{f_1} = m - s - k + 1$$

and

$$d_{f_2} = n - k - m + s \qquad\qquad (3)$$

Table 1 **Results of the Wilks' lambda test**

Removed root	Canonical correlation	χ2 test value	Number of degrees of freedom for the χ2 test	Probability level p for the χ2 test	Wilks' lambda statistic
0	0,9160	444,6656	222	0,0000	0,0068
1	0,8096	282,1036	180	0,0000	0,0420
2	0,7830	187,2682	140	0,0048	0,1220
3	0,5869	102,7625	102	0,4603	0,3152
4	0,5766	65,1749	66	0,5056	0,4808
5	0,5289	29,2027	32	0,6088	0,7203

Source: own study based on the Local Data Bank of the Central Statistical Office.

Based on the critical value of the significance level, only three canonical variables were addressed in the further steps of this analysis (at the significance level of 0,05, there are grounds for rejecting the null hypothesis on the absence of co-variability between the two sets).

The calculated canonical weights reflect the specific contribution of each sub-variable to the weighted sums (canonical variables). As the absolute value of the weight grows, so does the (positive or negative) contribution to the generation

of a canonical variable. The weights are interpreted similarly to the estimated beta coefficients in the multiple regression model which enable comparing the significance of predictors. For the first canonical variable, S13 and H3 have the highest (absolute) weights of 0,4341 and -0,4763, respectively. Therefore, it may be assumed that the correlation between the number of passenger cars per 1000 population and the population served by 1 pharmacy contributed the most to the creation of that canonical variable. In turn, S13 and H5 (nurses and midwives per 10000 population), and I1 (district's budget income per capita) and H4 (doctors per 10000 population) contribute the most to the second and third statistically significant canonical variable, respectively.

Also, the canonical analysis determined the load factor loadings and redundancies which provide valuable information on the sets of variables under consideration. Factor loadings are assimilated to correlation between canonical variables and the variables in each set. As assumed, the higher is the factor loading of a variable, the greater is the importance to be assigned to it when interpreting the model(s) of relationships between the sets covered by the analysis. In the set of variables referring to the sustainable development level of districts, as regards the first canonical variable, the highest factor loading is demonstrated by variable I6 (education expenditure per capita). As regards the second canonical variable, the decisive canonical loading is brought by variable S13 (number of passenger cars per 1000 population). In turn, as regards the third (last) statistically significant canonical variable, the highest factor loading is brought by variable G11 (CAPEX in enterprises per capita). In the second set of variables, the highest factor loading for the first two canonical variables is demonstrated by variable H5 (nurses and midwives per 10000 population); as regards the third canonical variable, the highest factor loading is carried by variable H4 (doctors per 10000 population).

Table 2 **Factor structure for the two sets of variables considered**

Set of variables reflecting the districts' sustainable development levels							
First canonical variable							
ED		SocD		EcoD		ID	
E2	0,65	S1	0,50	G1	0,55	I1	0,64
E3	-0,19	S2	-0,22	G3	0,48	I3	0,59
E4	0,42	S3	0,06	G4	0,47	I4	0,47
E5	0,42	S4	0,68	G5	0,28	I5	0,55
E6	0,57	S6	0,59	G6	0,43	I6	0,78
E7	0,58	S7	-0,15	G7	-0,32	I7	0,74
E8	-0,08	S8	0,41	G8	0,09		

Set of variables reflecting the districts' sustainable development levels							
First canonical variable							
ED		SocD		EcoD		ID	
E9	-0,12	S9	0,44	G9	0,35		
		S10	0,33	G10	0,07		
		S11	0,64	G11	0,20		
		S12	0,62				
		S13	-0,01				
		S14	0,03				

Set of variables reflecting the levels of material and human healthcare resources	
First canonical variable	
H1	0,6010
H2	0,2336
H3	-0,8235
H4	0,8115
H5	0,8657
H6	0,5849

Set of variables reflecting the districts' sustainable development levels							
Second canonical variable							
ED		SocD		EcoD		ID	
E2	-0,18	S1	0,01	G1	-0,21	I1	-0,16
E3	0,03	S2	-0,01	G3	-0,02	I3	-0,29
E4	-0,14	S3	0,01	G4	0,11	I4	-0,30
E5	-0,21	S4	-0,33	G5	-0,06	I5	-0,28
E6	-0,13	S6	-0,05	G6	-0,22	I6	-0,40
E7	-0,10	S7	-0,02	G7	0,05	I7	-0,08
E8	-0,04	S8	-0,02	G8	0,30		
E9	-0,03	S9	-0,12	G9	0,18		
		S10	-0,26	G10	-0,30		
		S11	-0,06	G11	0,05		
		S12	-0,20				
		S13	0,62				
		S14	-0,04				

Set of variables reflecting the districts' sustainable development levels			
Second canonical variable			
ED	SocD	EcoD	ID
Set of variables reflecting the levels of material and human healthcare resources			
Second canonical variable			
-0,2976			
-0,2616			
0,2782			
0,1767			
0,3742			
-0,3240			

Set of variables reflecting the districts' sustainable development levels							
Third canonical variable							
ED		SocD		EcoD		ID	
E2	-0,08	S1	-0,42	G1	-0,33	I1	0,31
E3	0,19	S2	-0,32	G3	-0,27	I3	0,02
E4	-0,05	S3	0,03	G4	-0,40	I4	-0,01
E5	-0,18	S4	0,28	G5	-0,35	I5	-0,08
E6	-0,27	S6	-0,29	G6	-0,34	I6	0,14
E7	-0,08	S7	0,37	G7	0,15	I7	-0,17
E8	-0,12	S8	-0,20	G8	0,07		
E9	-0,27	S9	-0,31	G9	0,24		
		S10	-0,27	G10	-0,28		
		S11	-0,02	G11	-0,49		
		S12	-0,13				
		S13	0,12				
		S14	-0,04				
Set of variables reflecting the levels of material and human healthcare resources							
Third canonical variable							
0,1766							
0,3550							
0,1225							
-0,4042							

Set of variables reflecting the districts' sustainable development levels			
Third canonical variable			
ED	SocD	EcoD	ID
0,2159			
0,2107			

Symbols: ED - environmental dimension; SocD - social dimension; EcoD - economic dimension; ID - institutional dimension.
Source: own study based on the Local Data Bank of the Central Statistical Office

In the analysis, for each statistically significant canonical variable, the mean square factor loadings were calculated: these are the variance extracted values which specify the percent of variance of input variables explained by the canonical variables concerned. By multiplying the mean square factor loading by canonical correlation squared, the redundancy index is calculated. It specifies the amount of mean variance in a set explained by a canonical variable with another specific set of variables, and takes the following form:

or

$$R^2_{u_l, x^2} = \bar{R}^2_{u_l} \cdot \lambda_l \text{ or } R^2_{v_l, x^1} = R^2_{v_l} \cdot \lambda_l, l = 1, 2, \dots, s. \quad (4)$$

with: λ_1- characteristic root of the matrix of squared canonical correlations.

From the perspective of these considerations, it should be noted that variance extracted indexes and total redundancy indexes are usually interpreted as the determinants of the correlation degree between two formulas. As shown by the calculations, the first canonical variable captures 47,40% of variance in the set of variables reflecting the saturation level of material and human healthcare resources in districts, and 20,56% of variance in the second set under consideration. The second canonical variable captures 8,51% of variance in the set of healthcare variables, and 4,12% in the set of variables describing the levels of sustainable development. The third canonical variable explains 7,11% of variance in the first set and 5,94% of variance in the second set. As regards the set of input variables reflecting the sustainable development levels of Western Poland districts, 39,77%, 5,58% and 4,36% of variance (respectively) in the set of variables referring to material and human healthcare resources may be explained. In turn, as regards the set of input healthcare variables, 17,25%, 2,70% and 3,64% of variance of the second set is explained based on the first, second and third statistically significant canonical variable, respectively.

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The next step was the calculation of total redundancy, interpreted as the mean percentage of variance explained in a set of variables with a specific second set based on all canonical variables. As shown by the calculations, knowing the values of variables describing the saturation level of material and human healthcare resources in districts, 25,48% of variance of variables from the set referring to sustainable development levels may be explained. Based on the above, it may be concluded that over one quarter of variation related to sustainable development levels of Western Poland districts is determined by sub-variables taken into consideration which refer to material and human healthcare resources. Note the extremely high and, most importantly, highly statistically significant (see Table 1) values of canonical correlations. However, that index is interpreted otherwise than the "ordinary" correlation coefficient; this value specifies the correlation between weighted sums in each set, with weights being calculated for subsequent canonical variables (to what degree was it possible to maximally correlate the corresponding pairs of canonical variables). The correlation coefficients for statistically significant canonical variables were above 0,78. This means the model used provides a good description of both datasets.

4   Conclusion

Because of the multifaceted nature of categories under consideration, a multidimensional explorative technique (canonical analysis) was used to identify the statistical relationships between them. The calculations resulted in identifying three statistically significant canonical variables. The correlation between the number of passenger cars per 1000 population and the population served by 1 pharmacy contributed the most to the creation of the first canonical variable. The

sub-variable related to the number of cars, together with the variable referring to the number of nurses and midwives per 10000 population, contributed the most to the specification of the second canonical variable. In turn, the variables related to the district's budget income per capita and the number of doctors per 10000 population contributed the most to the creation of the last statistically significant canonical variable. The resulting canonical analysis models provided grounds for the redundancy analysis. Based on that, it may be concluded that knowing the values of variables describing the saturation level of material and human health-care resources in districts, 25,48% of variance of variables from the set referring to sustainable development levels may be explained. In other words, one quarter of variation related to sustainable development levels of Western Poland districts is determined by the sub-variables taken into consideration which refer to health-care resources. Note also that the calculated values of canonical correlation coefficients were high, ranging from 0,78 and 0,92 in the case of statistically significant canonical variables.

To conclude, it should be emphasized that an "ordinary" correlation analysis or regression analysis would be insufficient due to multifaceted nature of processes under consideration. Thus, when addressing socio-economic issues, it becomes important to promote the use of multidimensional explorative techniques, including the canonical analysis, to assess the relationships between multifaceted categories.

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THE CONCEPT OF SUSTAINABLE DEVELOPMENT AT JORDANIAN UNIVERSITIES

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Abstract

The current world is struggling with many global problems which threaten more or less every country of the world and the countries of global South usually even in a higher extent. The interest of the international community in reducing these problems and achieving sustainable development of the world has been therefore graduating. However, in order for these efforts to be successful it is necessary to be active and also spread awareness among people. In particular, young people must be aware of the problems and possibilities to be able to operate actively in achieving sustainable development. Therefore, the paper will examine the importance of sustainable development concept in the countries of global South which are usually more affected by global problems, and especially its place and importance in Jordan as selected global South country. The main part will consist of the examination and analysis of the implementation of sustainable development concept in Jordanian higher education as the sphere which influence the personality and future conduct of young people in a high extent.

Keywords: *Jordanian sustainable development strategy, Jordanian universities, global problems, global South countries, sustainable development concept*

JEL classification: *Q01, I23, I28*

1   Introduction

Sustainable development (SD) concept and the strategy for its achievement have been resonating in all spheres of societies today. This world is struggling with

many global problems and their consequences threaten the entire world. The current state of individual societies and their exerted functioning still do not correspond to the sustainable course of the world. The interest of the international community in achieving SD of the world has been therefore starting to graduate, and individual countries are trying to eliminate global problems through setting common global goals. However, in order for these efforts to be successful it is necessary to spread awareness and inform as well as educate people about it. In particular, young people must be aware of all the problems and possibilities which they have to be able to operate actively in achieving SD, and to become active and conscious citizens in local as well as global dimension. The situation is problematic especially in developing countries which face many problems that directly affect and often threaten their very existence. Therefore, the importance of implementation of SD strategy and common goals is even more important for them and their education system (not excluding the tertiary level). The process of globalization goes hand in hand with the technological development and significantly changes the university education. The current demands on the graduates of the universities relate to the development of a new global environment (Svitačová – Pechočiak, 2017) and must be in harmony with the SD strategy.

1.1 Sustainable development strategy in global South countries

SD is an important concept and widespread strategy today. Generally, we understand this term as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). It is connected mainly with social and environmental problems that harm the world and its content should represent common strategy of the world community to remove or at least reduce these problems.

We can state that global South countries struggle on the consequences of the global problems generally more than countries of global North, although just the unsustainable behaviour of these more developed countries has been endangering the entire world more. Therefore, more prosperous, just and safe global future depends on new forms of behaviour at all levels and in the all interests (Elliot, 2006). "The notion of SD encompasses a wide range of concerns. It includes the capacity of the planet to absorb the changes brought about by human activities and of the substantially compromised development opportunities for many people in the world, particularly in the developing countries" (Elliot, 2006: 235-236). They have different interests in SD and contested views on what should occur in future. "More than ever today, development that respects the value of the natural environment is necessary, especially for those beset by poverty and whose natural resources are being degraded by the adverse impact of current patterns of

economic and social activity and lack of protection from natural disasters" (Strachan – Vigilance, 2011: 1).

SD is based on socio-cultural wellbeing, good governance, economic growth and environmental protection, which all contribute to reducing the risk of a disaster (Strachan – Vigilance, 2011). An added element of this is the role of the international community mainly in developing countries which includes technical and advisory support and resource mobilization. This is crucial mainly because a lack of finances is often one of the greatest obstacles in achieving SD. Also, for this purpose, 17 Sustainable Development Goals (SDGs) were adopted in 2015 as a part of the 2030 Agenda for Sustainable Development (United Nations, 2015) which currently represent one of the highest international priorities. These goals are precisely prepared and critically important for the development results of the countries. They address the universal need for development that works for all and there is a big support of global South countries too.

After adoption of the 2030 Agenda the efforts of less developed countries are more intensive, and the help of international community is more effective. Many of these countries are very active in this also in the context of governmental initiatives. However, they are facing many challenges. Mainly, the institutional capacity and effective institutional arrangements to implement SD strategies, the need for technical assistance, etc. Individual countries face their own challenges at local, regional and national level (Bryde – Mouzughi – Al Rasheed, 2015: 1 – 2). Those are interconnected with the global problems, so the implementation of national SD strategies and the international aid in those strategies can help to reduce most problems of these countries and make their lives better. It must be stated that for many less developed countries, SD is imperative rather than being a matter of choice. For many of them, the negative impacts of climate change not only pose major obstacles in achieving SDGs, but also threaten their very existence. In these countries generally, disasters cost more than in developed countries, causing serious setbacks to economic and social development. Therefore, a common challenge remains to address SD issues over the long-term, and to transform policies and strategies into programs and initiatives that make a positive impact on these countries. The implementation of national SD strategy needs to be an integral part of government policies. However, this is not only the responsibility of governments because SD can only be achieved through individual and collective efforts of all responsible actors (Strachan – Vigilance, 2011: 12 – 15).

The Hashemite Kingdom of Jordan belong among the countries of global South which need to adapt widely to the worldwide changes in parallel with an international aid. Although it is a modern western oriented monarchy, it is endangered by many global problems belonging to global SD strategy.

2   Data and Methods

This research study is based on the qualitative research and theoretical analysis of the strategy of SD in Jordan and its higher education system. In order to achieve these goals, we are going to use various research methods. Mainly we are going to map, describe and identify the SD concept and common goals adopted by the international community and their achieving in Jordanian Kingdom. Then we will explore, analyse and determine the place of SD concept in Jordanian higher education, amplified with the examination of the specific ways of its implementation and approaches of selected Jordanian universities in this issue. Our research should bring us closer the situation in these serious issues and allow us to make potential proposals for progress in the examined area.

2.1   Support of sustainable development strategy in Jordan

There has been considerable progress in many developing countries in terms of their pushing forward SD, although each country is in distinct stage. We are going to put our attention on the state of the application of SD strategy and SDGs in Jordan as a selected global South country.

According to UN, "Jordan has made considerable economic, social and human development achievements over the past decades, investing significantly in infrastructure, human resources, and improving upon living standards" (UN Knowledge Platform, 2017). Jordan was one of the first countries globally, and in the Arab Region, to act towards achievement of the Millennium Development Goals (UNDP, 2000) and it was very successful. However, during the last decade, it has faced many serious challenges.[6] That put increased pressure on Jordan's limited resources, especially sustainable management of water resources, increased the budget deficit and public debt. The country must face these problems with the help from international community.

Despite this, Jordan is strongly engaged in the 2030 Agenda and it tries to involve everyone in its society, also because the country was intensively involved in the global consultations for the development of the post-2015 agenda, and Queen Rania was one of the 27 world leaders who provided advice to the UN Secretary General on the shape of the 2030 Agenda's framework. This led to a natural adoption of the Agenda. Jordanian government presented plans for its implementing and achieving the SDGs, and priorities of Jordan in this field. The first was raising awareness of the 2030 Agenda and of the SDGs, targets, indicators and means

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[6]   Mostly the global financial crisis, region instability and the huge impact of the Syria war.

of implementation (UN Knowledge Platform, 2017) as a key basis for all other efforts.

Many important national strategies, plans and laws have been developed for the application of the 2030 Agenda in Jordan. The most important is the strategy *Jordan 2025* which contains several SDGs, mainly the eradication of poverty, the improvement of the education system, the provision of clear water and sanitation, the guarantee of decent work and economic growth, and the development of the sustainable communities and cities (UN Knowledge Platform, 2017).

There was established the UN Country Team (17 UN agencies' work in Jordan) to support achieving SDGs and assist to support national institutions to increase performance and improve capacities to deliver on Jordan 2025 and the SDGs (UN Knowledge Platform, 2017), increase individuals' knowledge of rights, access to information, education, skills, capacities and services, support engaging people and youth in economic, environmental and social processes, support Jordan to respond to the refugee crisis, etc. (SDG Knowledge Hub, 2017).

Jordan is an important global partner in achieving SDGs. However, it needs sustained and expanded financial and technical support in ensuring this. Important is Jordanian´s approach as they consider the 2030 Agenda as a collective responsibility. Also, the UN representatives stressed the exemplary cooperation of Jordan in achieving SD agenda. Notable progress is this country doing mainly in the field of water scarcity and food security (The Jordan Times, 2017).

According to the international community the 2030 Agenda has the potential to change our planet. Jordan welcomes it and it´s doing a considerable progress in its achieving. Energy, water and climate change, are cross-cutting issues fundamental to all SDGs, and also to development, security, and poverty reduction in Jordan. The SDGs are important for this country; therefore, the actions must be done comprehensively and collectively involving the entire community.

2.1.1 Continuation in sustainable development efforts

In July 2017, Jordan presented its Voluntary National Review (VNR) report to the Political Forum on SD at the United Nations. The VNR facilitates multi-stakeholder partnerships and details the Jordan´s plan to implement the SDGs. Jordan wants to focus on capacity-building and community awareness raising, as well as on support the statistical system to implement the SDGs at the local and national level (UNESCO, 2017). It highlights the need for support in SDGs from policy-makers and scientists. Jordan wants to support fully involved civil society and the private sector in achieving SDGs. Jordan wants to improve access to information and implement these issues into the education (also to tertiary level).

The goal is to let people know they have a real place in the development process (UNESCO, 2017).

There is also a specific UN project which focuses on 3 key goals that are essential for Jordan challenges in SD: SDG 6: Ensure access to water and sanitation for all; SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all; SDG 13: Take urgent action to combat climate change and its impacts. The project should mainly provide a framework within which policy makers can better understand the process of achieving these SDGs, situate the goals within existing environmental projects and develop strategies for how they can be achieved (WANA Institute, 2017).

2.2 Education for sustainable development as a part of Jordanian higher education

As the public awareness about SD concept and Agenda 2030 is not suitable in Jordan, there is a significant need to spread the knowledge and information among all people, and show them that everyone has a place in achieving SD. Even more important is to implement these issues to the education in Jordan, mainly to the tertiary level, as the universities form the personality of young people strongly and influence their direction how to behave. Therefore, our aim is to examine and analyse the integration of SD concept at Jordanian universities.

Rapid educational reform is taking place in Jordan today. The main goals are development of curricula, teacher education, using information and communication technology, improving teaching and learning strategies, and integrating new subjects. Education for SD can equip concerned citizens with critical thinking and problem-solving skills to build an economically, environmentally, and socially sustainable world. The main challenge in Jordan is how to merge all sustainability ideas and principles within various educational activities in different universities as there are about two hundred thousand university students who have a direct effect in any social change. The integration of this education is important also in order to find new ways to create knowledge needed in a world characterized by a turbulent environment and increasing changes (Abu-Hola – Tareef, 2009).

Various studies show that in past years the Education for SD was not clear enough among most of the researched staff at Jordanian universities, as well as among students. Most of academics did not consider different sustainability issues in their teaching (unless these issues came by the way). Lack of training towards gaining skills in teaching for sustainability was the leading problem. New staff training programs started to be realized together with other improvements, in order to raise awareness among academics and students as well (Abu-Hola – Tareef, 2009).

3 Results and Discussion

3.1 Implementation of sustainable development concept at selected Jordanian universities

After the unsatisfactory results in Jordanian higher education the challenge was to create innovative institutional and organizational structures in research and in teaching, that lead to innovative solutions for future development via the mutual learning process of all those concerned. Therefore, in this part we are going to analyse the findings from our examination from six selected universities in Jordan and the current situation in our researched area there.

3.1.1 University of Jordan (UJ)

This university as the oldest and one of the biggest in Jordan is very active in the implementation of SD concept and spreading awareness in these issues among students, teachers and broad public. It is very active mainly in launching SD study programs. For example, in 2014 UJ has launched a new master's *program in sustainable development*, as the first such specialisation in Jordan, with support of the Columbian University and the Jordanian Government. The programme seeks to provide students with the skills and knowledge required to design SD projects in sectors they are involved and enable them to tackle a variety of challenges including poverty, climate change and infectious diseases (The Jordanian Times, 2014).

This university has also a broad cooperation with European universities within EU Erasmus+ program in supporting these issues. One such a project is focused on creation of another study program called: *Smart Control Systems for Energy Management*. Its main objective is to increase public awareness and utilization of renewables, promote for energy saving and management and develop new research areas in those fields. In this project other two Jordanian universities (MUTAH and JUST) are involved too (UJ, 2017). Another program – "*Master on sustainable development and Renewable Energy*" – established within the cooperation of UJ, MUTAH, and JUST through the TEMPUS European program is also very important in this field. It is designed to discharge professional experts who will play a key role in the field of the renewable energy of energy efficiency future projects (UJ, n. d.).

Important is the *Water Energy and Environment Center* at UJ. It undertakes project research and assessment studies to address environmental challenges at local and regional levels. Its main task is to spread the knowledge about water, energy and environmental challenges in Jordan. It creates an active partnership

among academia, laboratories, industry, and government (UJ, 2016). There are also many academics at UJ who pay attention to the SD issues mainly in the context of renewable energy in their research work and in their publications.

3.1.2 Mutah University

Although, this university is technologically less advanced it pays quite significant attention to the concept of SD. The main activities are in the study programs content, for example, in *Mechanical engineering*. The growing concern for the environment has opened new opportunities for engineers. Mechanical engineers play major role in many fields of interest which include: energy utilization and conservation, production and processing machinery and their preserving, etc. They have responsibility for research and development, testing and maintenance, control, and manufacture in many diverse fields (Mutah University, 2018a).

Mutah University has got also a *Sustainability Website*. There it has identified the main key areas where sustainability can be achieved. The goals of the university presented there are, for example, to apply a solar power system and everything will run on 100% renewable energy. It has its own *Mutah University Sustainability Plan* which is considered the roadmap for building and operating more sustainable projects that strengthen their core research and teaching mission. The website supports also other university programs with significant environmental impact such as *Water Conservation Programs*, *Recycling Activities*, and *Energy Conservation Programs* (Mutah University, 2018b).

This university is interested also in spreading the SD concept through the conferences on sustainability (the next one prepared for April 2018 is called *Our Heritage between Sustainability and Crisis*). Similarly, at Mutah University there are many academics who publish various valuable papers and do the research in SD issues.

3.1.3 Jordan Universityof Science and Technology (JUST)

JUST is very modern and highly-developed university. Despite the fact, that generally the content of the education does not pay special attention to the application of SD concept itself, this university has minimally one study program, named *Renewable energy and Sustainable Development* at the Department of Mechanical Engineering (JUST, n. d.) created in above mentioned cooperation with other Jordanian universities. As JUST is really advanced in the scientific and technological field this program plays a significant role there.

There are also many academics who pay attention to the SD, mainly in the context of renewable energy, in their research work at JUST. JUST has also the

Jordan University of Science and Technology, Queen Rania Al-Abdullah Center for Environmental Science and Technology. The research in this center is focused on the water issue – its pollution, degradation and sanitation, efficient use management, and productivity (MENA NWC, 2016).

3.1.4 Al- Balqa' Applied University (BAU)

This university is very active in the implementation of SD concept, with wide range of activities directed to these issues. Its current scientific research is focused on several global problems of sustainability, mainly in the field of water resources and environment management, nutrition and food processing (BAU, 2014a). BAU see that the environmental challenges are complex and there is a need for all concerned institutions contribute to effectively manage the environment sustainably and ensure a sustainable management of these resources. BAU has therefore its study programs as well as specialized *International Research Center for Water, Environment and Energy,* focused on the mentioned issues, devoted to develop the understanding of the complexity of environmental problems and key issues at this university. The center has adopted water resources management, environmental impact assessment, and climate change issues as special priorities. It has also developed training programs that cover many disciplines in the examined issues to train experts in the field of natural resources management in the context of water, energy, and environment. The center also provides effective cooperation with other educational and other institutions in the field of SD. Emergence of the center was the result of cooperation among BAU, UNESCO, and UN Special Coordinator for achieving the Millennium Development Goals which even highlights its importance and university´s interest in achieving SD (BAU, 2014c).

Important is also the Faculty of Agricultural Technology in which the most active is the *Department of Water Resources and Environmental Management*. The Faculty is focused on protecting natural resources and the environment to maintain the sustainable agriculture. It has three other departments – Plant Production and protection, Biotechnology, and Nutrition and Food Processing focused on SD issues (BAU, 2014b).

Also, BAU has many academics whose research work is focused on SD. They publish many papers important for awareness rising in Jordan and do many international research and development projects focused on this field.

3.1.5 Al al-Bayt University (AABU)

AABU is another Jordanian university interested in SD concept at least at some extent. This university has own *Renewable and Sustainable Energy Department*

with the study programme *Sustainable and Renewable energy engineering*. To achieve its ultimate goal in spreading awareness about SD issues, AABU has established the *Institute of Earth and Environmental Sciences*, and the *Water, Environment and Arid Regions Research Centre* with own study programs. "Both have enabled AABU to conduct several researches on the neighbouring region in the areas of groundwater, soil and environmental pollution. They carry out environmental impact assessment studies for projects that will be established in this area, and serve the local community, governmental agencies and the private sector in conducting environmental monitoring programmes and environmental awareness campaign" (Egreen, n. d.).

AABU has many academics who are focused on these issues in their research work, too. They publish many papers important for awareness rising in this country, as well as do many international research and development projects focused on SD. Another specific field in which the AABU is active is the examination of SD in the Muslim context what has the potential to bring closer this important concept to the people with Islamic faith.

3.1.6 German Jordanian University (GJU)

GJU is unique university with obvious activities in applying SD concept to the education as it is interconnected with German University of Leipzig. GJU is, for example, involved in the project *Master on sustainable development and renewable energy* with objective to improve the capacities of 3 Jordanian Universities on renewable energies and energy efficiency, training new experts prepared for the labour market. Important is also that all students of GJU must complete one-year of study at German partner university where they meet SD in the education.

GJU has an individual *Department of Energy Engineering* focused mainly on the SD issues connected with energy – looking for new sources of sustainable energy – renewable energy – in all kinds for saving environment and solving global energy problems. These are rapidly growing fields of sustainability which are a great challenge to human contrivance. Each study program of this department is focused on this. The priority is to provide students with energy engineering education, especially in renewable energy and sustainable systems (GJU, 2018a).

GJU has an active cooperation with Italian University Research Centre for Sustainable Development which aim is to disseminate knowledge in SD. Another department focused on SD in the context of environment and renewable energy is the *Civil and Environmental Engineering Department* and mainly the program *Environmental and Renewable Energy Engineering. A*s GJU sees that world is rapidly facing the prospects of climate change and depletion of cheap fossil fuel resources it wants to prepare qualified professionals to rise to the challenges that will flow

from these threats. It wants their students to acquire a deep understanding of the issues of sustainability and of other connected issues (GJU, 2018b).

3.2 Summary

To summarize the results of our research of Jordanian higher education in the context of implementation SD concept and strategy, and interest of selected universities´ in applying these issues within their education, we can make several statements.

- Jordanian higher education is generally active in disseminating SD issues and strategy among students, teachers and public. There are intensive efforts in the awareness rising about these issues mainly through individual study programs present at each examined university that pay attention to the SD issues. Then, various research centers are established at most of examined institutions. Also organizing different scientific events, mainly conferences at national and also international level, is popular as well as broad research work of academic staff realized mainly through the research projects.
- There are still more frequent the international conferences held on the issues of SD organized by Jordanian universities also in common cooperation.
- There is a strong and active partnership among individual Jordanian universities also in the field of implementation of SD issues into their education systems.
- Strong and active partnership of Jordanian universities is clear also together with European universities through various EU projects, for supporting important topics of the current world, current challenges, and also issues connected with SD.
- Jordanian universities are mostly active in the issues of energy resources, water scarcity and environment as priority SDGs in the context of Jordan challenges.
- All the examined universities are active in SD education. According to the findings of our research, we can say that BAU and UJ are the most active in this field.
- The awareness rising is visible at all examined universities and the staff asked to help us with the research were mostly informed well about this concept.
- At each examined university there are still more academics focused on issues connected with SD concept, largely active in the field of renewable energy, water management and climate change which suits to the most important SD priorities settled for Jordan.

4 Conclusion

On the basis of the results we can state that there is a significant and growing interest in the implementation of SD issues in Jordanian higher education. Although, we can see there still some areas where the presence and the depth of the interest of the SD concept and strategy can be improved. In this context as the conclusion we present few following recommendations based on the result of our analysis and examination.

There is still a need to increasepublic and civil society awareness of the 2030 Agenda, including understanding the nature and potential of the SDGs and how institutions and individuals must adapt to address SD across all the education systems, not only in selected study programs or centers. SDGs are cross-cutting issues which can be implemented in every study program so that everyone will gain appropriate information, knowledge and skills. The national governmental support is also needed there. Similarly, bigger help from the private sector would be appropriate and helpful. There is "a need to develop new global skills for today's global labour market in the context of the demands of modern society" (Šeben Zaťková, 2015: 1144) influenced by globalization and all connected problems.

There is a need to promote bigger transparency and wider access to data and information to the government, institutional authorities as well as entire civil communities, through ICT, online social networks and community media to spread the issues among people.

Higher education system in Jordan can be improved in the field of SD education also through more practical learning. Gaining theoretical information and knowledge is important, however the proper importance will be gained only through the appropriate connection with practice. Students must see the reality and must learn how to contribute to the world sustainability personally. Mainly youth must see their role in this process more clearly.

On behalf of improving the education for SD at Jordanian universities there is a need to support academics training continuously as there are still new demands for globally prepared and educated teachers (see more in Šeben Zaťková et al., 2014) and other professionals today, so that students and broad public can acquire the proper information and knowledge in an effective and sustainable way from the highly trained experts.

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MANAGEMENT OF NATURE CONSERVATION IN SOUTHERN POLAND BY THE REGIONAL DIRECTORATE FOR ENVIROMENTAL PROTECTION - CASE STUDY FROM THE MAŁOPOLSKA VOIVODESHIP

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Abstract

The study combines considerations that fall within the scope of institutional management of nature conservation in the Małopolska region, situated in southern Poland, regarding the issue of protected xerothermic plant communities (Festuco-Brometea class). The latter, are considered to be one of the richest in number of vascular plants species. However, as semi-natural habitats, they need livestock grazing in order to stop natural plant succession. Such protective actions are organised by the Regional Directorate for Environmental Protection. These unique thermophilic steppe communities, located north of Krakow, are covered by Special Protection Areas, within Natura 2000 European network. An active protection of these grasslands is implemented mainly by providing financial support for sheep grazing. Therefore, efficient management means firstly introducing a complex system of selecting the areas, especially those which particularly deserve protection. Then, there is the issue of selecting farmers who would carry out sheep grazing in such habitats, but also who will be able to cope with a rather difficult management of the grazing process itself. Thus,

the crucial task for that institution is organizing financial support for farmers who decide to do such work. This includes the analysis of costs related to the protective actions with respect to the size of such habitats, as well as the number and abundance of protected plant species in particular areas. Results of the research show that institutional protection of xerothermic habitats, in the face of frequent abandonment of animal production by farmers, is especially important nowadays. It also seems there is no other alternative to it. However, the most problematic aspect seems to be the duration of such initiatives, which depend on repetitive financial support from various grants concerning nature conservation.

Keywords: *institutional level, Małopolska region, nature conservation*

JEL classification: *Q, Q5, Q57*

1   Introduction

Successful management of environmental protection and nature conservation is nowadays increasingly becoming the basis for the success or failure of economies and social systems in many European countries. New technologies for environmental protection are being applied, as well as great economic and social changes are being made for enhancing nature conservation in some agricultural and rural ecosystems. Moreover, environmental awareness affects more effectively the implementation of natural resources protection and its management (Dimitrov & Ivanova, 2017; Seroka-Stolka & Jelonek, 2013). On the other hand, unsustainable land management is considered to be one of the main factors of land degradation resulting from the lack of incentives to invest in sustainable land management. In recent years in Poland, a major issue seems to be a progress in deagrarianisation process in the agricultural production area e.g. in southern part of the country. That is leading to reduction of the biodiversity on arable land and grasslands, resulting from the discontinuation of agricultural use. Thus, scientists see conservation agriculture as an effective and sustainable practice for agricultural production (Daujanov, Groeneveld, Pulatov & Heijman, 2016; Musiał & Musiał, 2017). This issue applies to an environmentally sustainable economy as well, that requires that the principles of ecology establish the framework for the formulation of economic policy, and work in this regard is implemented by specific institutions (Brown, 2001; Hahn & Stavins, 1991; Power, 1996).

Solving such difficult issues, in the field of broadly understood environmental protection is largely the competence of the European Union member states. However, the perimeter of common arrangements made within the EU is constantly expanding in this respect. Also nature conservation, which is a component or

a subsystem of environmental protection, is the responsibility of national authorities, and as such depends on the organisation and efficiency of the broadly understood institutional system. This system is composed of the law on environment and nature protection, funds for protective activities, institutional structures and staff. The most important institution in this respect is the General Directorate for Environmental Protection (GDEP), along with its regional branches, i.e. the Regional Directorates for Environmental Protection (RDEP). GDEP is responsible for pursuing the environmental protection policy as regards managing the nature protection, also on the Natura 2000 areas, including the tasks related to preventing and repairing the damage done to the environment. This institution also manages the information about the environment, registers organisations that protect the environment in the national management and audit system, and also coordinates the network of national institutions that promote environmental protection. It coordinates the activities of implementing institutions as regards the use of European funds as well (The General Directorate for Environmental Protection, 2018).

The purpose of this paper is to indicate the position and organisational structure of the Regional Directorate for Environmental Protection and the area of its influence, on the example of selected Natura 2000 areas in the Małopolskie Voivodeship.

2   Data and Methods

The paper combines considerations in the field of institutional economics and management with the issue of nature conservation, with reference to the selected, protected plant habitats. The analysed example of managing the high-quality conservation sites, was a set of activities aimed at protecting the xerothermic grasslands within the Special Areas of Conservation, included in the Natura 2000 network. This is done through organising and funding the protective activities, including i.a. grazing of sheep and goats. The input material for these considerations was the analysis of the activities pursued by the Regional Directorate for Environmental Protection. In the period 2013-2017, this institution completed a project titled "Protecting xerothermic habitats in the Natura 2000 areas on the Miechów Upland" - LIFE12 NAT/PL/000053 (LIFE+ Xerotherms PL., 2018). The project covered the activities performed in 12 "nature" areas, located in 4 communes in the Miechów poviat, in the northern part of the Małopolska Voivodeship.

Geomorphologically, these areas are located within the Miechów Upland mesoregion, included in a bigger unit referred to as Niecka Nidziańska (the Nida

Basin). It is a fertile agricultural land with highly productive types of soil, such as *cambisols* and *leptosols*, which are also a good foundation for thermophilic plant communities (Bednarek & Prusinkiewicz, 1997; Bednarek, Charzyński & Kabała, 2009; Kondracki, 2009). A synthetic analysis of such protected thermophilic communities was performed, as they are the focus of the activities assigned by the RDEP. Latin names of the species were given according to a checklist of flowering plants of Poland (Mirek, Piękoś-Mirkowa, Zając, A. & Zając, M., 2002).The protected plant species occurring in the area were defined pursuant to the Regulation of the Minister of Environment on the protection of plant species (Journal of laws.., 2014). The phytosociological affiliation was given according to Matuszkiewicz (2002).

3 Results and Discussion

3.1 The essential impact and activities of the Regional Directorate for Environmental Protection

On the regional level there are various activities regarding nature conservation, resulting of legal requirements performed by the Regional Directorate for Environmental Protection, that are recommended by its Regional Director. This institution was established pursuant to the "Act of 3 October 2008, on publishing information about the environment and its conservation, public participation in the environmental protection and environmental impact assessment". This unit, as part of non-associated government administration, is responsible for pursuing the national policy in the area of environment and nature conservation on the Voivodeship level (Journal of laws.., 2017). The tasks resulting of that act, are implemented by the regional director for environmental protection along with the Directorate office. These tasks are performed in cooperation with the directors of landscape parks. Nature conservation in the region is the responsibility of the deputy regional director, who is at the same time the regional nature conservationist. The operational functions of the regional directorate are multifaceted, and they are pursued within the structure of this institution (Figure 1).

In the section of the first deputy director, who is at the same time the regional nature conservationist, general tasks assigned to nature conservation are pursued. The scope of action for the Division for Nature Conservation and Natura 2000 is preparing various regulations concerning the protection plans and tasks for Natura 2000 areas and nature reserves. Administrative activities and attention also focus on landscape parks and protected landscape areas. For such areas, the office pursues activities aimed at defining various projects and plans related to

their spatial development. This also refers to the location of new public investments and issuing decisions related to land development conditions. The main tasks, that are currently of major significance are: protection of plant, animal and fungal species, protection of natural and semi-natural habitats, such as various grasslands and woodlands, as well as estimating the damage done by protected animals. These activities substantially focus on pursuing the changeable state policy in this respect.

Figure 1 **Main tasks pursued by the Regional Directorate for Environmental Protection**
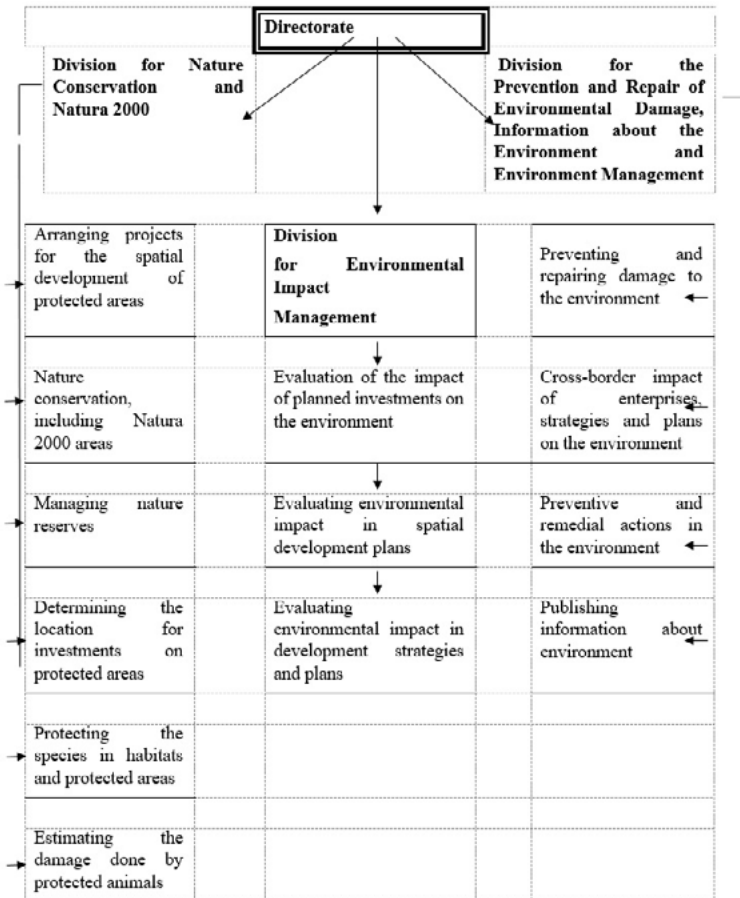
Source: Data from the RDEP in Cracow and the Act of 3/ 10/2008

The Division for Environmental Impact Management, copes with administrative procedures and the progress of the evaluation of impact of the enterprises, that may significantly affect the environment. This refers e.g. to the planned investments in transport, commercial investments and various infrastructural projects. Measures are also taken here, to ensure strategic evaluation of environmental impact related to the spatial development plans (e.g. municipal plans), and other local and regional strategies, plans and development programmes. The third substantive section of this institution, is the Division for the Prevention and Repair of Environmental Damage, Information about the Environment and Environment Management, performs four groups of tasks. If there is a direct threat of damage to environment, a decision is issued that obliges business entities to implement preventive and remedial measures, and it is in this section that the conditions for implementing such measures are defined. This is also where the proceedings are conducted, as regards the cross-border impact on the environment, of which the General Director for Environmental protection is notified when necessary. Remedial and preventive actions are taken here, when damage has been done to the environment and there is a risk to human life or health, and the perpetrator of the damage has not been determined. Apart from the tasks divided among the three analysed divisions located in the office of the Regional Director, there are two field branches in the Małopolska Voivodeship: in Tarnów and in Nowy Sącz. The Regional Director regulates their competences, considering the nature of the tasks to be implemented locally. In the implementation of these activities, the Regional Directorate also cooperates with numerous institutions, especially on the regional level whose competences include environmental protection, as well as with agricultural institutions.

3.2   Institutional protection of precious xerothermic habitats

In the Małopolska Voivodeship there are many Natura 2000 areas with xerothermic habitats, for example in the Małe Pieniny mountain range and the Ojców National Park. The Natura 2000 areas have been established also for the numerous xerothermic grasslands on the Miechów Upland. The latter grow in the isolated habitat sites, one separated from the others like mosaic of islands, located on the southern slopes of the hills made of cretaceous marl. Thanks to the presence of fertile soils, this mesoregion is a typically agricultural land, but due to the strongly undulating landscape, with steep and short slopes, scarps and ravines, the numerous enclaves or scrapes of fields have lost their productive functions. This process in the Miechów region has been rather intense for the past 30-40 years and it is strongly related to the fact that the minor farms in the region have ceased to breed ruminants. As a result, some arable fields, especially those further from the farms,

have gradually become useless for intense farming and returned to their natural, wild state. However, the semi-natural ecosystems created by the thermophilic grassland habitats have taken centuries to appear in the interaction with extensive farming and their existence depends on the sustained animal production.

Xerothermic grasslands of the Miechów Upland have been formed thanks to such human activities like grazing, especially using sheep. The local breed of sheep from this region is the Olkusz sheep (Murawski, 2011). As follows from the current state of knowledge and the so called "good practice", grazing small ruminants in various types of grasslands is in general the most effective and the cheapest way of providing long-term protection to the plant species. Thanks to the grazing, it is possible to keep the xerothermic grasslands in a proper condition, including maintenance of the significant orchid sites, which are priority habitats within the Natura 2000 network. Livestock grazing in these semi-natural habitats, is aimed for maintaining the succession process on the level, that is desirable from the perspective of biodiversity. However, since the economy and farming were brought to the market in 1989, and especially since Poland integrated with the European Union in 2004, along with the changes in economic relations and farming methods, regular grazing on relatively small, dispersed and isolated xerothermic grasslands has ceased to become profitable. As a result, over the past few decades, the phenomenon of productive deagrarianisation has been observed in this region (Musiał, 2017). This process also upsets the local migration paths of xerothermic species among the existing patches of grasslands. As a result, the advanced succession towards bushlands and forest habitats is becoming a considerable problem, because such habitats cannot sustain themselves in the landscape when left intact (Kostuch & Misztal, 2006; Loster & Gawroński, 2005; Xerothermic flora.., 2012; Musiał & Grygierzec, 2017; Musiał, Szewczyk, Walczak & Grygierzec, 2017). Maintaining their natural values requires currently extensive measures related to active protection, that is managed by the Division for Nature Conservation and Natura 2000, within the RDEP (Figure 1).

The LIFE12 NAT/PL/000053 Project is an example of such activities, implemented by this institution in the Małopolska Voivodeship. In Miechów Upland it was initiated in 2013, with the budget of 6.5 million PLN, 75% of which comes from the European Commission sources, and 25% from the Fund for Environmental Protection. Protective activities include a total of 12 areas within the Natura 2000 network (tab. 1). Individual areas are relatively small, from 3.70 ha (Uniejów Parcele) to 25.60 ha (Kalina Mała), and all of them have a total area of 136.87 ha. These areas are usually compact and dense, although some of the enclaves may be dispersed, e.g. the Natura 2000 Poradów area. These "nature" areas

are usually intertwined with small arable fields, where mainly cereal is grown, and forest edges. The structure of land ownership is just as diverse and often complex: it can be private ownership, land cooperatives, land owned by the State Treasury and land managed by communes. These areas also include the land purchased by the RDEP from the funds coming from the Life Project, and this is a total area of 18.2 ha, i.e. 13.3% of the total area covered by the project.

Table 1 **Selected characteristics of the Natura 2000 areas where xerothermic habitats are actively protected (Project LIFE12 NAT/PL/000053)**

	Name and symbol of the Natura 2000 area	Area in ha.	Share in %	Number of vascular plant species	Number of protected plant species	Commune
1.	Cybowa Góra PLH120049*	18.18	13.26	308	14	Słaboszów
2.	Grzymałów PLH120053*	15.23	11.13	327	22	Słaboszów
3.	Giebułtów PLH120051*	6.38	4.66	235	17	Książ Wielki
4.	Kalina Mała PLH120054*	25.60	18.71	303	12	Miechów
5.	Kaczmarowe Doły PLH120062*	12.62	9.22	197	11	Miechów
6.	Sławice Duchowne PLH120074*	4.41	3.22	143	3	Miechów
7.	Komorów PLH120055*	4.91	3.59	162	3	Miechów
8.	Widnica PLH120076*	7.89	5.74	171	4	Miechów
9.	Pstroszyce PLH120073*	19.44	14.20	176	4	Miechów
10.	Chodów-Falniów PLH120063*	7.27	5.13	147	7	Charsznica
11.	Uniejów Parcele PLH120075*	3.70	2.70	203	8	Miechów
12.	Poradów PLH120072*	11.30	8.26	180	8	Miechów
	-	136,87	100,0	-	-	-

Source: data from the RDEP in Cracow

Explanations to the table: *Code of the area assigned by the European Commission

These Natura 2000 habitats are unique on the scale of the whole country, and are assigned to the class *Festuco-Brometea* (Br.-Bl. et. R.Tx. 1943). The most frequently represented association within this class is here *Inuletum ensifoliae* (Kozł. 1925) (Matuszkiewicz, 2002). Despite the anthropogenic origin, both the class and association are of high natural importance, due to the unique composition of plant species. Among them, there are many species not observed in any other habitats in Poland, including those that are protected and referred to as rare elements of the Polish flora, e.g. : *Adonis vernalis* (L.), *Allium rotundum* (L.), *Aster amellus* (L.), *Linum hirsutum* (L.) and *L. flavum* (L.). These are so called steppe species, which came to the area of our country from the south-east during the late glacial period, ca. 9-10 thousand years ago, when there was no forest cover in this area yet. Thus, it is believed that the growth of numerous grasslands in the Central Europe was directly related to the alternating agricultural and shepherding activities in the periods from the Bronze Age to the early Middle Ages. In these Natura 2000 sites there are also some rare orchid species, e.g.: *Ophrys insectifera* (L.), *Orchis millitaris* (L.), *Gymnadenia conopsea* (L.), and *Cypripedium calceolus* (L.). Richness of plant species from this class is confirmed by numerous studies (Kostuch & Misztal, 2006; Loster & Gawroński; Musiał & Grygierzec, 2017). Moreover, in some of those "nature" sites, there were more than 300 vascular plant species: in the area of Grzymałów (327), in Cybowa Góra (308) and in Kalina Mała (303) (tab. 1). There were also many plant species under legal protection, in this respect the most numerous in such species were the area of Grzymałów (22) and Giebułtów (17), first located in Słaboszów and second in Książ Wielki Commune. To support that habitats, it is necessary to maintain proper habitat conditions, regarding level of light intensity and temperature in the thermophilic bushlands. That is essential not only for plant species, but also for many rare animals, especially invertebrates. Thus, it seems crucial to promote the traditional, extensive economy and local breeds of animals in that territory (Loster & Gawroński, 2005; Misztal & Bedla, 2013).

When analysing the process of managing the discussed xerothermic grasslands, one should note three parallel forms of protective activities. These are: cutting the bushlands and woods, mechanical mowing or cutting with scythe and grazing maintenance, especially with small ruminants, such as goats or sheep. The last form may be regarded as basic in this case. It is however, rather complex from the institutional perspective, as it is organisationally challenging and rather expensive. Under a project developed by RDEP in Cracow, 152 Olkusz sheep and 12 goats were purchased, which were then handed over for grazing to the farmers

who undertook to perform maintenance on the xerothermic grasslands by controlled, supervised grazing. In each of the 12 "nature" enclaves, protective activities are performed by one farmer-nature conservationist, who usually drives the sheep or goats to a specific area with grassland habitats and arranges the grazing by dividing the enclave into quarters and separating them with a fence. Then he supervises the animals and provides supplementary feed.

The proportion of animals intended for grazing is 0.4 LSU/ha, which follows from the general requirements for protecting compact habitats in agricultural-environmental and climate-related programmes: PROW 2014-2020. The farmers-nature conservationists are selected from among those who expressed interest in grazing and participated in a tender. The criterion for the tender is the proposed rate for the service. As a rule, the farmer should obtain at least the minimum wage for the grazing period, which is paid under a concluded mandatory contract. Apart from the remuneration for working with the animals and driving them to the grazing site, the farmer also receives funds to cover the maintenance of the animals throughout the year. The contracts are individual, though, and refer to a specific mini-herd, i.e. 5-10 sheep or goats, rather than a whole herd, which is usually increasing and becomes the property of the farmer, such a herd may participate in the maintenance grazing programme to a limited extent. Contracts for the grazing are concluded with the farmers for three years and a lump-sum payment is made for this period.

Although the project for protective activities covering the xerothermic grasslands was formally finished in 2017, the services offered by the farmers will continue for two more years. This briefly presented form of protecting xerothermic grasslands through controlled grazing may be an example of an advanced form of active protection of such assets. However, it is not permanent and not foreseeable in the years to come and for the future, because it relies on budget funding in the form of grants. Also on private land it is possible to implement optional plant protection, i.e. when the farmer who owns the land agrees to it. The non-financial, intangible aspect is of importance here namely the environmental awareness. Although it is on the increase, especially among younger people, it could still be a lot better. It would require extensive cooperation among institutions, non-government organisations dealing with environmental protection and ecology, associations of farmers, local authorities and schools. It is important that the issue of protecting living natural resources, also those that are part of the relationship between agriculture and ecosystem protection, be understood and acknowledged by farmers themselves. Such protection should be of interest to them. Active protection of the "nature" areas should still be treated as an important public service and as such it should obtain permanent funding addressed to the entities that

provide such a service (e.g. farmers) and various statutory institutions that implement activities related to environmental protection.

4   Conclusion

Deagrarianisation processes that have recently been occurring in Poland, including in particular productive deagrarianisation, usually mean that the land is no longer farmed. This is especially true in the case of low-quality, difficult and technologically challenging land, e.g. in the places where the area is sloping and the land is far from the farm itself. More and more farms cease to breed ruminants, which makes some of the grasslands useless from the agricultural point of view. These processes cause changes in the ecosystems shaped through extensive farming, and such changes include: the expansion of bushlands, forests and reduced biodiversity.

Especially in the Natura 2000 areas, it is vital to keep cultivating the farmland, including the grasslands. This way it is possible to preserve biotic abundance, also with reference to protected vascular plant species. In the xerothermic grasslands of the Miechów Upland, the Life Project was implemented in the years 2012-2017. The project funded various activities aimed at preserving the biodiversity and protected plant species. Active protection involved the choice of one out of three protective activities or a combination of them, i.e.: cutting down excess trees and bushes, mowing, and most importantly, controlled grazing of small ruminants, i.e. goats and sheep. As part of the project, the RDEP in Cracow implemented protective activities in 12 Natura 2000 areas, with a total area of 136.87 ha, i.e. most of the fields were the private property of individual farmers. Ca. 18.2 ha of land were purchased, all of this area is now managed exclusively with protective activities in mind. 152 sheep are grazed in this area as well as 12 goats, which are maintained and taken care of by the farmers, who also act there as nature conservationists. These farmers are paid for the service they provide.

This was accomplished thanks to the project with the budget of 6.5 million PLN. The adopted organisational solution is not permanent, as it relies on grants, but it is a precious form of protecting xerothermic grasslands and an example of an innovative approach combining institutional actions with protective initiatives implemented by farmers and based on commercial principles. It seems especially important, as this semi-natural xerothermic flora has considerable natural values, but it is also a living monument of the farming culture in this particular region, and a proof of the history of communities that used to live there.

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TOWARDS SUSTAINABLE DEVELOPMENT OF AGRICULTURE: SIGNIFICANCE OF COOPERATIVES IN THE CASE OF JAPAN

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Abstract

This paper will claim that sustainable development of agriculture is crucially involved in family farming. Further, the strength of family farming is essential for the maintenance and sustainable development of local community. The paper will highlight the role of agricultural cooperatives in this context - ,the importance of family farming and local community for productive, resilient and sustainable development of agriculture. The present Japan agricultural cooperatives, a consumer cooperative, credit union, and credit cooperative, all have their roots in the Industry Cooperative Association Act in 1900. The original main aim of this Act was to protect micro-and small enterprises from overwhelming big business. At present agricultural cooperatives have attracted criticism regarding raison d'être from governmental council and some other groups. Each party shows quite a distinctive standpoint on this issue, the one based on the perspective of community agriculture development and the other the principle of open economy with free competition. The paper will show that agricultural cooperatives are of great importance for sustainable development of agriculture itself but also of the region as a whole.

Keywords: *sustainable agriculture, family farming, community farming, agricultural cooperatives, regional development, market fundamentalism*

JEL classification: *R11, Q13, Q18, Q19*

1   Introduction

Decreasing population of young people in not only rural areas but also small and medium-sized cities has been visible since the 80's in Japan. They have moved out to large cities looking for job, and elderly people have remained in these areas. In consequence, a primary industry, agriculture, has been facing crisis. Agriculture is not just for food production, but has the other important functions for region – protection of natural environment and sustenance of agricultural community. Agriculture as such may not be compatible with economic efficiency, but plays pivotal role as substructure in region. Such features show the significance of agriculture.

Agricultural cooperative in Japan has a long history, which has its origin in 1900. The idea and execution of cooperative organization in agrarian society ascends to the late *Edo* era (1603 – 1868). Agriculture has developed and changed ever since, to which agricultural cooperatives have been corresponding by and large. In this context, the political measures for agriculture and agricultural cooperatives have always come at the top of agenda in Japan.

TPP (Trans Pacific Partnership) is a recent big issue argued on a national scale from two different viewpoints, for or against, the former is for open economy with free competition and the latter for sustainable development of agriculture based on community agriculture. The paper intends to claim agricultural cooperatives and family farming are basic for sustainable agriculture in Japan. For this purpose, the paper structure is as follows. Firstly explored is the background and the principles of agricultural cooperatives. Then the relationships between the cooperatives and community agriculture are explained. Thirdly, a number of case studies will show the going-on projects in regional district. Fourthly, recent criticism of mainly the government council and business leaders for agricultural cooperatives will be remarked. The conclusion is that it is important to grasp the significance of community agriculture, which is the foundation of regional regeneration and sustainable development at the grass roots level. It is the agricultural cooperatives that are the pivot of community agriculture development in Japan.

2   Agricultural cooperatives

Agricultural cooperatives have played the central role for management of community agriculture. They encompass a wide range of activities.It has a long history in organizing farmers

2.1 History

Prototype of cooperatives in Japan emerged in the first half of 19th century in the dismantling period of feudal *Tokugawa* shogunate. History shows two cooperatives in that era, one is for mutual aid organised by *Ninomiya Sontoku* and the other by *Ōhara Yūgaku* to help farmers. Their rules of organization are based on moral and ethics. The former was outstandingly successful, getting support of peasants, expanded cultivation, and increased production and population (Ōtahara, 2013, 1). Legal industrial cooperatives began with enactment of Industrial Union Law in 1900. Even before, however, many modern autogenous cooperatives had been established in agrarian society: credit union, raw silk sales union, tea sales union, fertilizer purchasing were the main among 347 unions in 1898 (Japan Agricultural Cooperatives & Hokkaido Agricultural Cooperative Federation, 2016).

Their activities cover;conducting credit business (savings, loan), economic business (sale of rice, vegetables, every kind of agricultural products), cooperative purchasing (fertiliser, feedstuff, agricultural machines, other commodities for living), contracting to agricultural management, mutual aid business (various life mutual aids, automobile mutual aids, etc.), gas station, hospital, and educational activities for improvement of management and skill. This configuration is derived from 'zoning', in which farmers joined as a whole in agricultural cooperative in the district. 'Zoning' as such had aimed, after the Great Depression in 1929, at rebuilding rural economy in protracted slump. The government vigorously pushed forward a campaign for rural economic rehabilitation movement. The main task was to target and to mine the problems at the grassroots level of villages and farm household. In order to deal with this matter, in 1932 the parliament debated several amendments to the Industrial Union Law. Following the administrative claim, the 1932 National Conference of Industrial Union decided the Five Years' Expansion Plan: 1. *Elimination of unestablished villages*, 2. *All households subscription*, 3. *Four kinds provision* (*concurrent undertaking of four kinds of provision*), 4. *Strengthening union control force* (Ōtahara, 2013, 2). This is a start of 'zoning', and followed by 75 per cent of organization rate of the union in 1932. This is the origin and the base of Japan Agricultural Cooperatives. The cooperatives correspond each to three levels of government agencies, with municipality (659 single cooperatives), prefecture, and state. Further, they function as administrative complement (Ōtahara, 2013).

2.2   Issues: What the Cooperative is doing?

It is the point that the coperatives are organised essentially aiming at supporting economically disadvantaged people. In actuality, what they are doing regionally? They support agriculture in many ways – by sale, purchasing production materials, provision of information, coaching, technical supervision by permanent or visiting staff, use business. They meet needs for both large and small farmers, for elderly farmer, and farmer with a side-job. Apart from agricultural support itself, they support people's everyday life necessity in region as mentioned section 1above. Notably, welfare work (Agricultural Cooperatives for Health and Welfare) is particularly helpful in rural area where aging population is increasing. At the municipality level, they provide regular health check annually, at the prefectural level, they provide clinics and hospitals, and welfare work for elderly people, in particular (Kawamura, 2016) (JA Zenkōren).

Agricultural cooperatives have been thoroughly engaged and involved in agriculture and people both economically and socially. Their bond is with people, different from corporation which bond with money. Further, corporations target maximum profit and do not expand business if profit hits the limit. Cooperatives expand business as long as income is over expense. It is notable that cooperatives contribute to regional service (Kawamura, 2016). Otherwise, the structure of agricultural community has been changing in terms of increasing part-time and decreasing full-time farmers. Further, wide area merger at the level of municipality may have resulted in a less close and contact relationships between local people and agricultural cooperatives. This may bring a negative influence over the cooperatives in terms of regional management. Above all it is the imperative that local people have the will themselves to solve a problem or difficult situation together. This makes agricultural cooperatives possible to play an active part in such a situation with them (Kawamura, 2016).

In sum, Japan agricultural cooperatives have contributed basically to the region through their local cooperatives in management of agriculture and of business, recreating town, people and job. It is notable that the cooperatives have accumulated a lot of useful and precise information in terms of conversion of agricultural land, land use adjustment and village farming, which have also enabled them to contribute to administration. It would be natural consequence that the Cooperatives as such should be the core of management issues challenging to community or village or 'teikei' in terms of agricultural status and prospect in Japan. However, the present government is planning, based on market fundamentalism (Shimohirao, 2000), to dismantle this comprehensive agricultural cooperative and to trust each part in corporations. This is the reality of community agriculture and agriculture cooperatives in Japan.

3 Case studies: community agriculture development

Community agriculture requires a kind of dialogue with environment, between producers and consumers for development. Such relationships open up mutual understanding and aid in terms of community agriculture, local culture and environment. This development would be a major factor to lead to regional regeneration

3.1 'Michi no eki (roadside station)'

Apart from, as the normal provider of agricultural products, there has been a variety of community agriculture's relationship with consumers. It seems depending on regional resources, including natural or physical ones and also infrastructure. One of the notable examples may be 'Michi no eki (roadside station)'. It is actually roadside rest areas which are government (Ministry of Land, Infrastructure, Transport and Tourism) designated stops and found along roads and highways. It combines three main facilities, for 'rest for 24 hours available with free parking and toilet', 'transmission of information about traffic, tourism, medical help and so on', and 'regional cooperation and promotion related to culture, knowledge, tourism and recreation'. At present (April, 2017) the registered 'Michi no eki' accounts for 1,117 in number (Ministry of Land, Infrastructure, Transport and Tourism). It started in the year of 1993with 103 registered 'Michi no eki'. Its outstanding attraction is commonly *local agricultural products, local speciality, or the principle products of the district.* 'Michi no eki' have been achieving innovative or creative developments which vary depending on managerial challenges to its district resources (Ministry of Land, Infrastructure, Transport and Tourism). Its assignment is finding out its feature product, which may imply re-finding out their resources, environment or traditional culture or history. Agencies including government and regional cooperatives, co-op (i.e. pal-system group), and agricultural cooperatives are crucially involved in managerial issues. Also, Small and Medium-Sized Enterprise Cooperatives have been crucial in supporting their managerial challenges with their considerable expertise and temporary staffing in dealing with small business (Shoko Research Institute) as one of the core for regional regeneration.

3.2 'Sannchoku teikei'

Another type of community agriculture with consumers is notably '*sannchoku teikei*' or just called '*teikei*' in the West. This began in 1960s in Japan and has

spread out to Swiss, Germany and to the United States (Tsutaya, 2009). In the West it is related to 'CSA (community supported agriculture)'. '*Teikei*' literally indicates to sell farm products in a style similar to the direct sales by using a shared store or the like. It is a direct relationship between producers and consumers. Kyoto co-op established the three principles of '*sannchoku teikei*': • Producer and growing area are defined, • Growing methods (used chemicals and fertilisers) are defined, • Producer and consumer cultivate a relationship between (Yoshida, 1988). It seems to be expanding in various ways. Among them 'JA Farmers'Market' is well recognised as large-sized with direct relation between producers and consumers. It accounts for about 1,700 of its number in Japan (Nikkei, 06/12 2016). They are managed by local JA (Japan Agricultural Cooperatives). One of the hugely successful 'JA Farmers' Market' is 'Mekkemon hiroba (good bargain plaza)' in Wakayama prefecture. Its success may be explained by a number of managerial approaches which reflects the current situation of agricultural farmers and consumers. Many farmers are aging in average and rural areas getting depopulated. They tend to grow small quantity each, but a large variety of products as a result. This trend actually suits consumers' demand which covers a wide variety of products. In this context small scaled farmers assemble their small productivity. Then as a whole district agricultural productivity is improved. Further, marketing management is carried out by JA staff who have good experience and expertise in actual agriculture and management (Takayama, 06/12 2016).

There are many cases recognized in which some relationships are made for the distribution of farm products under the collaboration with agricultural cooperatives, co-op (pal-system) and farmers in a local community. In some cases, such a relationship has developed in and extended to further involvement of consumers to experience agricultural labor and production with farmers (Takayama, 2016). Actually such development and extension of relationship between producers and consumers nurture their common aim at environment protection, organic production and 'work and live together' for sustainable agriculture and future.

Both local agricultural products in '*Michi no eki*' and '*sannchoku teikei*' are expected not only fresh but ideally organic. However, the reality of organic farming is rather disappointing. According to Ministry of Agriculture, Forestry and Fishery, while the percentage is increasing trend, the ratio of organic farming land is 0.5 per cent in 2016 and the target is 1 per cent by 2018

4 Comparative viewpoints of Japan with the West in terms of community agriculture and CSA (community supported agriculture)

'*Sannchoku teikei*' or just called '*teikei*' in the West began in 1960s in Japan and has spread out to Swiss, Germany and to the United States (Tsutaya, 2009). In some cases in Japan, such a relationship has developed in and extended to further involvement of consumers to experience agricultural labor and production with farmers (Takayama, 2016). In the West, it is related to 'CSA (community supported agriculture)'. Even derived from '*teikei*', CSA looks quite distinctive from a structural aspect of it. '*Teikei*' is part of community agriculture aiming at village or town regeneration.

CSA is a marketing strategy where consumers buy "shares" in the farm before planting begins and receive a portion of whatever is available each week of the growing season; some shares include other products, such as eggs, honey, flowers, and/or meat (Brown & Miller,2008). It is spreading and has become increasingly visible (Brown & Miller, 2008; White, 2013). It is notable that some articles about CSA are pointedly related to ecology, environment, microeconomic degrowth and ethics (Jorgenson & Clark, 2012; Sproul, &Kropp, 2015; Chales, 2011).

5 Community agriculture and TPP (Trans Pacific Partnership)

TPP indicates essentially open economy with free competition. It is opposite to the perspective of community agriculture and cooperatives. It is crucial to grasp that TPP could boost corporation agriculture and disintegrate community agriculture. This could help a further disappearing rural landscape. This is the main logic that agricultural cooperatives are against TPP.

6 Conclusion

Community agriculture may be characteristic of Japan. It is generally for rice as the staple crop ever since the feudal Edo era, while people's diet at present is changing in westernized somehow. It has been the foundation of community solidarity. We should appreciate that it must be not only for self-sufficiency of rice as staple food. Rice farming offers not only physical but also environmental reward (Kitaide, 2016). For example, irrigated rice field provides clean water by filtering function, keeping level of underground water properly, a better substitute

for dam. Further, irrigated rice field is wildlife habitat, frog, *medaka* (tiny fish in the water), loach, crayfish, dragonflies, diving beetles, spiders and so on.

Promoting self-sufficiency of rice as staple food is important on the one hand. Various challenges of alternative crops are going on the other. Agricultural cooperatives and other cooperatives are always with these challenges. TPP could destroy community agriculture as such.

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FACTORS INFLUENCING RESPONDENT'S WILLINGNESS TO PAY ENVIRONMENTAL TAX

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Abstract

Environmental issues are very popular these days, and people tend to behave responsible in relation to nature and environment. This tendency leads to ecological lifestyle producing less waste and to using "green" technologies. One from the tools of state policy to influence quality of environment is environmental tax. There is a question, if the people´s tendency to behave environmentally responsible also leads to their inclination to pay environmental tax. Willingness to pay environmental tax can be therefore considered as the measure of environmental preference and trust in the efficiency of government system and its ability to protect environment. The main objective of presented paper is to identify main indicators influencing tendency to pay environmental tax. Source of the analyzed data was European value study conducted in Bulgaria, Cyprus, Germany, Finland, Hungary, Italy, Poland, Romania, Sweden and Slovenia in the period of years from 2010 to 2015. Database contains 2800 observations. Method used to identification of the main factors influencing respondent´s willingness to pay environmental taxes was binary logit model. If respondent would be able to give up part of their income to protect environment, dependent variable was equal to 1, if they answer was negative, dependent variable was equal to 0. As the explanatory variables in the model were used possible factors influencing they willingness to pay environmental tax, such as: their support of awareness about environmental protection and taxes, trust in governments ability to protect environment, gender, age, if they have children or not, education, social class, trust in government, trust in environmental organizations, trust in the European union, religion and employment. Estimated model was evaluated using percentage of correct predictions and likelihood test. Influence of significant factors was evaluated using odds ratios derived from the final model. Results suggests, that

highest influence on the tendency of people to pay environmental taxes have follow-ing factors: respondent´s support of awareness about environmental protection and taxes, trust in governments ability to protect environment, trust in environmental organizations, trust in the European union, education and religion. First mentioned factor is strongly connected with environmental responsibility of respondent. There-fore, it is logical its highest influence (odds ratio 17,46). Except for this factor had the highest influence education (odds ratio 1,23) of respondent and his trust to environ-mental organizations (odds ratio 1,22).

Keywords: *binary logit, environmental preference,environmental tax,*

JEL classification: *C25, C51, H23, R11*

1 Introduction

Environmental issues became very popular these days, especially due to increas-ing rate of economic growth. Many people declare their interest in environmental problems and protection of the environment. Due to many controversial ecolog-ical indicators, it took a long time to find reliable tool to measure level of sus-tainable development (Hanova and Prokeinova 2008). On the other side, current environmental conditions do not suggest, that people really follow their declared preferences. One way how to measure real individual environmental preferenc-es is willingness of people to support environmental protection financially. Data coming from World Value Survey, European Value Survey and International Social Research Programme allows to investigate individual support of environ-mental protection and its comparison. Respondents were asked questions about their willingness to financial support of environmental protection and prevention of environmental pollution. These data can be used as the estimate of marginal willingness to pay for environmental protection. In general, factors which has the potential to influence environmental preferences can be classified into two broad categories: individual specifics and specifics at country level.

Objective of prior studies was to analyse determinants of individual finan-cial support of environmental protection and to investigate its relationship with environmental tax reform. The question is, how the fulfilment of environmental objectives influences the extent of meeting economic policy targets. On the other side, environmental tax reform influences also individual behaviour and affects prices of non-market natural materials and increases the cost of activities pollut-ing environment (Ercolano et al. 2013).

According to many authors (Auci et al. 2006, Torgler and Garcia-Valinas 2007, Franzen and Meyer 2010), main factors influencing individual environmental

preferences are income, age, gender, education and employment. Positive correlation was identified between tendency to financial support of environmental protection, education, and income of respondents (Kollmann et al. 2012).

On the other side, factors age and gender are controversial in case of analysis including also geographic factor (Torgler and Garcia – Valinas 2007, Olofsson and Ohman 2006, Kollmann et al. 2012).

Environmental preferences are also strongly correlated with political attitudes. Political affiliation, interest in political discussion, identification with political ideology and political party should be taken also into account in the analysis of environmental preferences (Witzke and Urfei 2001).

Other considered variables measuring individual social capital, which influence tendency to support financially environmental protection, are attitude to tax evasion (Auci et al. 2006), trust in government (Dorsch 2011) and membership in volunteer organization (Torgler and Garcia-Valinas 2007). According to Greeley (2007) is important indicator of civic values also factor of religion. Identification with certain religion, and with certain local or global community and its perception of the environment is also important factors influencing individual preferences.

Tendency to financial support of environmental protection is higher, when people see themselves as active citizens who perceive surrounding world and people with pessimistic attitude and sensitivity to environmental risk (Dorsh 2011, Kollmann et al. 2012).

Prior econometric models usually incorporate also geographical location of respondents, index of wealth (Franzen and Meyer 2010), rate of corruption, institutional quality and tax pressure (Auci et al. 2006). Many authors used also variables related to state of the environment, such as index of sustainability (Franzen and Meyer 2010), level of air pollution in household (Auci et al. 2006), level of noise and waste (Witzke a Urfei 2001), index of environmental protection (Dorsh 2011). From the methodological point of view were results obtained by logistic regression, which allows for variable variation (Ercolano et al. 2013).

The main objective of the presented paper is identification of the main factors influencing willingness of respondents to financial support of environmental protection and their willingness to pay environmental tax. These factors were determined first in the pooled set of data and later were investigated regional specifics in the investigated countries.

2 Data and Methods

Data used in the estimated model comes from Eurostat (Environmental tax) and European value survey (individual preferences) which took place in period of years 2010-2015. Survey database includes information about 2800 respondents. In the analysed period were included in the survey 10 countries: Bulgaria, Cyprus, Germany, Finland, Hungary, Italy, Poland, Romania, Sweden and Slovenia. Estimated model includes following variables:

- prefET -Would you give up part of your income to protect environment in form of environmental tax? (0-no, 1-yes) -dependent variable
- infET – do you agree with increasing awareness about environmental taxes to protect environment? (0-no, 1-yes)
- government – should government decrease environmental pollution without decreasing your income? (0-no, 1-yes)
- gender – 0- female, 1-male
- age – 1-18 to 29 years, 2-30-49 years, 3- 50 and more years
- children – 0 do not have children, 1-have at least one child
- education – 1-basic, 2-highschool, 3-university education
- social class – 1-lowest 2-lower middle class, 3-middle class, 4-higher middle class, 5-high society
- trust in Gov – do you trust your government? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Trust EO – Do you trust Environmental Organizations? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Trust EU – Do you trust European Union? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Religion – Is religion important to you? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Employment - factor included using 3 dummy variables, D1=1 if retired, D2=1 if student, D3=1 if employed, if D1,D2,D3 are equal to 0 denotes unemployed people.

Model

If the Y is a binary response variable equal to 1 when the attribute is present and 0 if it is not present in observation. If $x=(x_1,x_2,x_3....x_k)$ is a set of explanatory variables which can be discrete, continuous or a combination. Binary dependent variable was prefET (1 if respondent would like to support environmental protection financially, otherwise 0), other factors described above were considered as the explanatory variables (Menard 2018)

Logistic regression model presents conditional probabilities (log odds) through a linear function of the predictors expressed as:

$$\ln \frac{P(y_i = 1)}{P(y_i = 0)} = \beta_0 + x_i^T \beta = I_i \qquad (1)$$

Where $\beta = (\beta_1, \beta_2, \dots \beta_k)^T$ i s the estimated vector of k predictor coefficients. Vector of parameters β is estimated using maximum likelihood method. Following likelihood function is maximized:

$$\ln[L(\beta)] = \sum_{i=1}^{n} y_i \ln \frac{exp(I_i)}{1 + exp(I_i)} + (1 - y_i)\ln \frac{1}{1 + exp(I_i)} = \sum_{i=1}^{n} \langle y_i I_i - \ln[1 + exp(I_i)] \rangle \qquad (2)$$

Then predicted probability can be expressed as follows:

$$F_i(I_i) = P(y_i = 1) = \frac{exp(I_i)}{1 + exp(I_i)} \qquad (3)$$

It is difficult to relate estimated parameters value directly with the outcome. Better way how to explain influence of explanatory variables on the outcome, is the interpretation of the odds ratio rather than estimated parameters of logistic regression. Odd ratio is Euler number raised to value of the estimated coefficient of logistic regression.

$$Odds\ Ratio_j = e^{B_j} \qquad (4)$$

If the odds ratio of the explanatory variable is higher than 1, it means that increasing of explanatory variable will increase also odds in favor of positive outcome. On the other side, if the odds ratio is smaller than 1, increasing value of explanatory variable will decrease chance of positive outcome.

In case of logistic regression is no more necessary to hold the assumptions of classical linear econometric model based on ordinary least square. Linear relationship between dependent and independent variables, explained variables and error term does not need to be normally distributed. Logistic regression also does not need variances to be homoscedastic and can handle also nominal or ordinal data as explanatory variables. Models were estimated using SAS 9.4.

3   Results and Discussion

Binary logit model was estimated using the data coming from European value survey. Basic indicators of model quality were McFadden R-Squared and number of correct predictions. Due to nature of dependent variables was McFadden

pseudo R-square value 0,28 which suggest excellent model fit. (Interpretation of McFadden R-square is different from classical R-square known from OLS, in this case are expected lower values due to nature of dependent variable). Accuracy of the model measured by correct predictions was 78,7%, which also suggest good prediction ability of the model. Model was evaluated as significant and appropriate to describe suggested relationship among variables. It means, that most of the estimated model parameters are significantly different from zero (p-value 0,0000). In table 1 are shown the factors which affects significantly tendency of respondents to financial support environmental protection.

Table 1 **Estimated logit model**

variable	pvalue	slope at mean	coefficient	odds ratio	significance
Intercept	<0,0001		-1,82		***
InfET	<0,0001	0,52	2,86	17,46	***
government	<0,0001	-0,16	-0,70	0,50	***
gender	0,29	-0,02	-0,11	0,90	
age	0,17	0,03	0,12	1,13	
children	0,51	-0,02	-0,09	0,92	
education	0,00	0,05	0,21	1,23	***
trust in government	0,85	0,00	-0,01	0,99	
trust in EO	0,00	0,05	0,20	1,22	***
trust in EU	0,02	0,03	0,15	1,16	**
religion	0,04	0,02	0,10	1,10	**
social class	0,06	0,03	0,11	1,11	
retirement	0,46	-0,03	-0,13	0,87	
student	0,72	0,02	0,08	1,09	
employee	0,87	-0,01	-0,02	0,98	

Source: Author´s work

Following factors included in the model were evaluated as significant: InfET, government, education, trust in EO, trust in EU and religion. It means that people who agree with increasing awareness about environmental taxes are also ready to support environmental protection financially. Strength of their conviction correlates with their tendency to financial support. This variable was evaluated as the most significant, it means that people who agree with environmental taxes would probably pay them.

Second important factor was education. With increasing degree of education will people more likely to pay environmental tax. Each level of education will increase odds in favour of paying environmental tax by 23%. More educated people prefer ecological lifestyle, and have tendency to support environment also financially. Another important variable was trust in environmental organizations. With increasing level of trust in environmental organizations, increased also tendency of respondent´s to support them financially. In this case, if level of environmental organizations support increase by 1, odds in favour of financial support of environment will increase by 22%.

Similar result was recorded also in case of trust in EU. People who trust in EU will be more likely to pay environmental tax. If the level of trust in EU will increase by one, odds in favour of financial contribution will increase by 16%.

Last significant factor, which increase probability in favour of environmental tax is religion. If the self-evaluation of religious preferences increased by 1, it increased also odds in favour of environmental tax by 10%. More religious people will therefore more likely contribute to environmental protection financially. Last variable which was evaluated as significant was the one denoted as government. It included answers to question: should government decrease environmental pollution without decreasing your income? People who replied positively to this question have 50% smaller probability of supporting environment financially. From all the indicators considered in the model, this one was the only factor decreasing the probability of paying environmental tax. All the other indicators included in the model were evaluated as insignificant.

Results interpreted above comes from econometric model, which was estimated using pooled data coming from all European countries included in the survey. This offers general information about factors, which influence environmental preferences of people in the analysed set of countries. On the other side, there are also country specific factors different for each nation. Factors, which were evaluated as insignificant in general result can be significant in the result for individual country. This is caused by cultural and social diversity in Europe.

Individual specifics **of investigated countries**

Analogical models were estimated for all investigated countries using the same dependent and explanatory variables, as it was in case of pooled model. All the individual models were significant, since p-value testing joint significance of estimated coefficients was less than 0,05. Significance of individual variables was different. This was influenced especially by specific socio-economic and cultural conditions in each analysed country. Estimated odds ratios for individual models can be found in table 2. Odds ratios offers in this case better information than

estimated coefficients, due to their direct relation with modelled phenomenon. The odds ratio higher than 1 suggest, that variable support willingness of people to pay environmental tax, odds ratio smaller than 1 means factor which decrease chance that people will support environment financially.

In all investigated countries was the most significant variable infET, which is in accordance with general model. It is because of strong correlation of this question with dependent variable.

Variable denoted as government, which was respondents' agreement with decreasing environmental pollution by government without decreasing respondents' income, was evaluated in general model as significant with negative effect on dependent variable. In case of individual models for Italy, Poland, Romania and Sweden was parameter of this variable very significant (p-value less than 0,01), in case of Cyprus, Germany and Finland was this parameter significant (p-value less than 0,05). People who agreed with the statement about government in Italy have 90% less odds to contribute to environmental protection financially than people who did not agree. In Finland was this difference only in odds only 55%. On the other side, in Italy and Poland would people support environmental protection financially despite their positive answer to this question.

Table 2 **Estimated odd ratios in individual models for each country**

Variable /country	BG	CY	DE	FI	HU
Intercept	0,025***	0,308	0,924	0,093**	0,346
infET	11,029***	10,689***	25,473***	9,758***	12,815***
government	0,639	0,378**	0,412**	0,449**	0,592
gender	0,81	0,774	0,41***	1,197	1,781
age	1,202	0,927	1,17	1,17	1,21
children	1,015	0,892	0,881	0,851	0,39**
education	1,076	1,038	1,204	1,202***	0,87
TrustGov	0,723	1,49	0,917	1,09	0,848
TrustEO	1,424	1,245	0,852	1,115	1,499
TrustEU	1,099	1,403	0,862	0,692	1,061
religion	1,273	1,192	0,568***	1,166	1,091
social class	1,794**	1,362	1,257	0,975	1,148
retired	1,398	0,429	1,047	0,845	0,889
students	3,778	0,248	0,721	4,026	0,252
employed	2,55**	0,535	0,663	0,789	0,573

Variable /country	IT	PL	RO	SE	SL
Intercept	0,066	0,87	0,116	0,069	0,085**
infET	29,648***	16,945***	19,441***	7,737***	8,057***
government	0,101***	0,304***	0,149***	0,367***	0,953
gender	1,367	0,429**	0,753	1,244	0,999
age	1,355	0,927	1,123	1,588	1,681
children	0,363**	0,445	1,401	1,562	0,509
education	1,468	0,865	1,744**	1,238	1,249
TrustGov	1,134	1,097	1,202	0,922	0,705
TrustEO	1,827**	1,12	1,163	1,153	1,281
TrustEU	1,313	0,98	1,637**	1,585**	1,214
religion	0,739	1,274	1,193	0,85	1,447**
social class	1,219	1,027	0,69	0,956	1,14
retired	1,279	2,332	0,973	1,224	0,92
students	1,232	2,212	5,079	1,159	1,851
employed	0,761	1,343	1,083	1,268	1,369

Source: Author´s work

Variable "trust in EU" was strongly significant only in Sweden (p-value less than 0,01) and significant (p-value less than 0,05) in Romania. People who trust European Union has 58% higher chance to pay environmental tax in Sweden and 63% to pay environmental tax in Romania. In Italy was significant also factor "Trust in Environmental Organisations". In this country, people who trust environmental organizations have 82% higher odds in favour to support environment financially.

Factor specific only for Bulgaria was social class. According to estimated model, people who belongs to higher social class have 79% higher odds than others to support environmental protection financially.

Curious result was found in case of Religion. This parameter was significant in Germany and Slovenia. While in Slovenia have religious people 45% higher odds of willingness to pay environmental tax, on the other side, in Germany are religious people less willing to pay environmental tax (odds smaller by 43%).

Education was factor specifically significant in Finland and Romania. In both countries are people with higher education more willing to pay environmental tax. In Romania have people with higher education 74% higher odds in favour of paying environmental tax. In Finland it was only 20% higher odds.

Factor gender was significant only in Germany and Poland. In both cases are women more environmentally oriented gender. In Germany are odds in favour of paying environmental tax higher in case of women by 41% than in case of men. In Poland was this difference 43%.

Another specific factor influencing willingness to pay environmental tax was Children. This factor was significant only in Hungary and Italy. In both countries are people with children less willing to pay environmental tax. In case of Hungary have people with children 61% smaller odds in favour to pay environmental tax, in Italy it was 63%.

Last factor included in the estimated models as explanatory variable was employment. Suggested model distinguished between students, employed, unemployed and retired people. This variable was significant only in case of Bulgaria. In this country are employed people 2,5 times more willing to pay environmental tax.

4   Conclusion

Proposed paper was focused on the investigation of the factors which influence tendency of people to financial support of environmental protection. The main objective was identification of the most significant factors, and partial objective was identification of factors specific for individual countries. According to result of the model estimated using the data collected in 10 countries for the period 2010-2015 are the most important following factors: individual support of awareness about environmental protection, their agreement with the statement that people should also support financially environmental protection, education, trust in European Union and Environmental organisations and religion. In case of first two factors were result expected, because data correlated with environmental preference of people. According to other variables, people who have tendency to support environmental protection also with their own financial sources are better educated, religious and trust in environmental organisations and European Union. This can be described as the average environmental supporter in ten analysed countries.

Next step of the conducted analysis was the estimation of individual model for each analysed country to investigate country specific factors and to identify differences between countries. The results of individual models suggest, that if people support increasing of awareness about environmental issues, they would also contribute financially to protect environment. This variable was significant in all the estimated models which is expected due to strong correlation of this variable with dependent variable. This was expected also in the case of second variable.

This variable was related to question, if government should finance environmental protection without decreasing individuals' income. Despite of expectations, this variable was not significant in case of Bulgaria, Hungary and Slovenia.

Significance of other variables were different in each analysed country. In case of Bulgaria are environmental preferences influenced especially by economic factors social class and employment. It means that employed people and people from higher social class are more willing to support environment financially. This can be related with economic situation in this country.

In case of Germany was significant only social factors gender and religion. Despite of expectations, result suggest that women and less religious people will have tendency to support environmental tax more. This result is in contrast with Slovenia, where was the only significant factor religion, and estimated odd ratio suggest, that increasing religiosity will increase environmental support. On the other side, significant influence of gender in Germany corresponds to almost the same result in Poland.

The only significant factor in Finland was education. Each level of education will increase odds in favour of environmental protection by 20%. In Romania was the effect of education even stronger (74%). In this country were environmental preferences affected also by trust in EU. This corresponds also with Sweden results. In both countries are environmental preferences strongly related to trust in EU. Result suggest, that supporters of environmental tax are people with stronger trust in EU.

Factor specific for Hungary and Italy were children. Estimated odd ratios suggests that people with children are less willing to support environment financially. It can be related to their economic situation, and with the fact that they probably use these financial sources rather for their children. Another significant factor significantly influencing environmental preferences in Italy was trust in environmental organizations.

Result suggest, that willingness of people to support environment financially is connected in the first place with their environmental preferences. Other factors differ among countries. This is influenced by economic, social and cultural factors specific for each individual country. This should be considered particularly in case of environmental promotion campaign in these countries. Especially in situation, when new environmental taxes are introduced and government wants to increase awareness about environmental protection.

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PERSPECTIVES FOR DEVELOPMENT OF THE MARKET FOR FERTILIZERS DERIVED FROM BY-PRODUCTS OF COAL BURNING AS AN ELEMENT OF SUSTAINABLE WASTE MANAGEMENT

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Abstract

The paper aimed at an identification and estimation of development of the market for sulphur-calcium fertilizers derived from by-products of hard coal combustion in thermal power and power plants in Poland.Obtained data and quantitative and qualitative information were processed using the methodology usually applied in the subject literature to conduct the research and analyses of this type, and the results were presented as estimations and forecasts. Assessment of the sales market potential for sulphur-calcium fertilizers was made on the basis of crop requirements for sulphur and calcium and their cultivation area. The analysis made use of standard balance methodologies and laboratory tests, which allowed to estimate the requirements for sulphur and calcium in plants constituting the greatest share in the cropping area of individual farms, which according to the classification of the Central Statistical Office are situated in six regions of Poland, including the provinces in their areas. Basing on the estimation of sales potential for sulphur-calcium fertilizers made on the basis of the crop requirement for sulphur and calcium and their cultivation area in Poland, it may be assumed that the prospect for market development is

highly favourable. It may be forecasted, that in future an upward demand trend will be observed on sulphur-calcium fertilizer market in Poland, particularly on the level of commercial agriculture, because the increasingly more apparent negligence concerning progressive soil acidification will cause a necessity for application of a considerably greater amount of calcium fertilizers for recultivation of arable lands on farms. An additional advantage of these fertilizer products is the fact that as a source of assimilable sulphur they provide a considerably cheaper alternative for multi component mineral fertilizers, whose necessary application in intensive agricultural production involves high outlays. This property is particularly important also in the situation of increasingly higher sulphur deficiency in arable soils and yearly growing popularity of sulphur-loving plants, economically important in Poland. Marketing of a sulphur-calcium fertilizer, containing greater amounts of sulphur (considering pure component) and some amount of microelements at more competitive market prices, may prove a good alternative for agricultural producers. The more so, as it is a by-product of some other production process, which is important from the cost intensity point of view of its manufacturing and advantageous considering the realization of aims and assumptions of sustainable development.

Keywords: *sulphur-calcium fertilizer, sustainable development, FGD gypsum, fluidized bed combustion ashes, Poland.*

JEL classification: *E23, O44, P28, Q13, Q15, Q56*

1   Introduction

Apparent and sometimes revolutionary social and institutional changes have been noticeable in the European Union over the recent years, serving to realise the goals and assumptions of a sustainable waste management. The changes concern, among others the waste generated during the process of basic fuels combustion, comprising petroleum, natural gas, hard or brown coal. An integral element of both electric and thermal energy production is generation of secondary post-production materials. An example may be mineral waste called combustion by-products (CBP) emerging during the technological processes of coal and plant biomass combustion (Alvarez-Ayuso, Querol & Tomás, 2006; Hao & Guo, 2012; Hycnar, Szczygielski, Lysek, & Rajczyk, 2014). The most frequently generated CBP include the mixtures of fluidized fly and bed combustion ashes and synthetic gypsum, also called flue gas desulphurization gypsum (FDG) originating from exhaust fumes desulphurization by wet calcium method applied in the process of hard or brown coal burning in traditional electric and thermal power plants (Martinez-Tarazona & Spears, 1996; Córdoba, 2015).

The largest amounts of fluidized bed combustion ashes are managed for the realization of engineering and hydrotechnical constructions, such as highways and roads, construction and reinforcement of river embankments, solidification and recultivation of mining landfill sites, as well as for reinforcement and sealing (isolation) of post-mining sites. Fluidized bed combustion ashes from the current production are applied in the above mentioned cases as a binding material and binder-aggregate mixtures. Fly ashes deposited on landfills, particularly those "extinguished" with water are also suitable for use as replacements of earth masses and an element for correcting granular composition and moisture of mixtures used for engineering structures (Szczygielski, Tora, Kornacki & Hycnar, 2017). Sulphate calcium products, e.g. FGD gypsum obtained as a by-product of coal combustion are mainly used by the construction materials industry. Raw gypsum is used as a timer for commonly used cements binding and after partial dehydration (calcinated gypsum, hemihydrate, gypsum hemihydrate) becomes a binding material, i.e. the basic component of gypsum binders and plaster mixtures. Large amounts of FDG gypsum are also used for plasterboards manufacturing, prefabricated gypsum construction and stucco elements (Szlugaj & Galos, 2006).

Currently, coal is the most important carrier of generated electric and thermal energy, which causes that is plays a key role in the energy safety (Kaliski, Sikora & Szurlej, 2014). Over 90% of production in the national energy sector bases on hard coal and brown coal combustion. Each year about 15 million tons of fluidized bed combustion ashes and slag and almost 5 million tones of gypsums are produced in the flue gas desulphurization installations (Galos, Szlugaj & Burkowicz, 2016). Presented volume of annual CBP output evidences that Poland is one of the leading generators of this type of energy production waste among the EU countries. A high CBP supply potential and the appropriate legal regulations cause that the previous forms of their management as raw materials or technological components used mainly by the road and construction industries became insufficient. The more so, as in compliance with the provisions of the act of 14 December 2012 on waste (Polish Journal of Laws 2013, item 21), the manufacturer decides to treat CBP as waste with all legal and financial consequences, or as an integral part of his production subject to management and control, which provides a possibility for their much wider use as an important component for the production of many other products. Therefore, intensive research has been conducted for some years on potential alternative CBP by-products management, as exemplified by attempts to apply them in the manufacturing of fertilizers or soil substrates for specialist agronomic crops (DeSutter & Cihacek, 2009; Yunusa, Loganathan, Nissanka, Manoharan, Burchett, Skilbeck & Eamus, 2012; Wang, Bai & Yang, 2013; Watts & Dick, 2014; Szlugaj & Noworyta, 2015; Wang & Yang, 2018).

The result of research on potential applications of CBP in agriculture are sulphur-calcium fertilizers which appeared on Polish market and which are a useful source of easily available sulphur, which in the conditions of constantly growing share of sulphur-loving plants in the domestic cropping structure may prove advantageous for both Polish producers of this type of products and for the farmers themselves. Therefore, the aim of the paper is an estimation of a potential market for fertilizers derived from by-products of hard coal combustion in thermal power and power plants in Poland (fluidal ashes and FDG gypsum).

2   Data and Methods

The estimation of a potential market for sulphur-calcium fertilizers derived from coal combustion by-products (CBP) during the flue gas desulphurization process by wet limestone method was made on the basis of determined level of selected crops demand for nutrients, i.e. sulphur (S) and calcium (Ca) contained in the presented fertilizer and their cropping area in 2016. The analysed fertilizer was a mixture of FDG gypsum obtained from TAURON S.A. – Łaziska power plant in Łaziska Górne and fluidized bed combustion ash obtained from TAURON S.A. – power plant in Jaworzno II, turbogenerator 3 in Jaworzno (Table 1).

Table 1 **Selected properties of tested fertilizer**

Specification	UPS	Fe	CaO	SO$_3$
	[%]			
FGD gypsum	65	0.0	24.7	25.2
Fluidized bed combustion ashes	35	1.1	9.5	3.1
Total	100	1.1	34.2	28.3

Source: Author`s research.

Sulphur (S) contained in the presented product occurs in sulphates, iron (Fe) in carbonates and sulphates, whereas calcium (Ca) in carbonates, sulphates and oxides. The product reveals a considerable mechanical strength, which allows to apply it using standard fertilizer spreaders available on Polish market. Due to sulphur (S) occurrence in different chemical forms, the fertilizer has an effect characteristic for the products with slow release of nutrients (micro- and macro-elements). Some components are released immediately after use, thus fertilization before sowing or top dressing are much more effective. Moreover, the sulphate form of sulphur (S) contained in the fertilizer ensures a high degree of its binding

and retaining in the substratum structure, which makes it more resistant to washing out and better available to plants. Another advantage of the tested fertilizer is its neutral impact on pH, which may be important in reducing the causes and outcomes of excessive soil acidification in various regions of Poland (Filipek & Skowrońska, 2013). However, research has indicated that in the first place the product may be also classified to mineral fertilizers which are primarily used to supply sufficient amounts of sulphur (S) to the sulphur loving plants (e.g. rapeseed, agrimony, maize, corns, sugar beet, pulses, legumes and vegetables) (Skwierawska, Krzebietke, Jankowski, Benedycka & Mackiewicz-Walc, 2014).

The analysis conducted as an attempt at estimating market potential for sulphur-calcium fertilizers derived from CBPs, used a standard balance method and laboratory tests, which allowed to determine the crop demand for the nutrients (S and Ca) contained in the tested product, which is of major importance in the commodity structure of private farms located in the areas of six regions of Poland (central, southern, eastern, north-western, south-western and northern) including the provinces situated in their areas (Table 2).

Table 2 **Area and share of tested crop groups in cropping structure in Poland in 2016**

Specification	Cultivation area [ha]	Share in cropping system [%]
Maize	1 039 778	11.7
Rapeseed and agrimony	802 454	8.0
Wheat	2 048 652	21.4
Barley	847 808	8.1
Triticale	1 346 149	13.8
Oat	463 370	5.2
Potatoes	296 658	2.7
Sugar beets	169 312	1.7

Source: Author`s calculations based on data base of Central Statistical Office of Poland. Retrieved from http://www.stat.gov.pl

Application of balance method, from the group of traditional methods of determining crop fertilizer requirements, involved a comparison of the analyzed nutrient expenditure (uptake with the yield, nutrient losses in soil) with the nutrient supply (supplied through organic fertilizers, atmospheric precipitations, harvest residual, element release in soils, etc.) (Burczyk, 2010). Results of conducted balance allowed to formulate fertilizer recommendations, i.e. estimate an average dose of the fertilizer derived from a mixture of fluidized bed combustion ashes

and FDG gypsum, which should be applied on 1ha cultivation area assumed for an analysis of crops, i.e. maize, rapeseed and agrimony, wheat, barley, trticale, oat, potatoes and sugar beets (Table 3).

Table 3: **Fertilizer recommendations for crops**

Specification	Assumed amount of main yield [t · ha⁻¹]	Application date*			Recommended dose [kg · ha⁻¹]
		spring	autumn	top dressing	
Maize	10	++	+++	+	450
Rapeseed and agrimony	3-4	++	+++	+	500
Wheat	6-7	++	+++	++	400
Barley	7	++	+++	++	450
Triticale	6	++	+++	++	400
Oat	5	+++	+++	++	300
Potatoes	50	+++	+++	+	300
Sugar beets	50	+++	+++	++	400

* (+) - highly positive result of application, (++) - average result of application (+++) - low effect of application.
Source: Author's research.

On the basis of developed fertilizer doses (recommendations) for the studied crop groups and their cropping areas, an attempt was made to estimate a potential demand for sulphur-calcium fertilizers, whose basic components are coal combustion by-products (CBP) in electric and power stations in Poland including spatial diversification of the conditions for the development of domestic market for fertilizers and other plant growth stimulator.

3   Results and Discussion

Poland ranks 5th in Europe regarding the size of mineral fertilizers manufacturing (behind Russia, Belarus, Germany and the Ukraine). The national fertilizer market is responsible for manufacturing of almost 1.5% of the world production volume. Out of about 2.5 million tons of manufactured NPK, over 2 million tons in terms of pure component is consumed by the domestic agriculture (Zalewski & Rembeza, 2013). While analyzing the mineral fertilization level for over more than a dozen years, it may be seen that fertilizer consumption reveals an apparent upward trend. The trend results from many conditionings of Polish agriculture

development, including the ongoing intensification process of expenditure on agronomic inputs, which to a major extent concerns medium sized and large farms and those situated in the regions with good agricultural and environmental conditions. It is also connected with an improved economic situation in Polish agriculture, both due to the situation on world agricultural markets, Poland's integration into the European Union structures and including farms in the Common Agricultural Policy. Despite a wider openness to foreign food products in Poland after the European integration, domestic production of agricultural raw materials and ready-to eat food has been and will be of major importance for people's nutrition. However, growing competition of the EU agricultural markets forces Polish producers to increase their productivity, which in case of crop production is possible mainly using mineral fertilizers and plant growth stimulators (Sroka & Musiał, 2015).

Traditional agriculture focuses mainly on fertilization with main nutrients, including: nitrogen (N), phosphorus (P), potassium (K), magnesium (Mg) and calcium (Ca). However, intensification of crop production leads to an increase in the amount of other nutrients taken up from soil, which in a longer perspective may lead to worsening its properties as a productive substratum. The phenomenon concerns particularly microelements and macroelements, which are the supplementary components of the most popular mineral fertilizers. Over the recent years, for instance visual symptoms of sulphur (S) deficiency, which is the secondary component of NPK mineral fertilizers, may be observed on the fields in Poland (Kaczor & Zuzańska, 2009; Filipek-Mazur, 2011; Potarzycki, Przygocka-Cyna, Wendel, Biniek & Ridiger, 2015).

Sulphur is the element whose deficiency became increasingly more perceptible in agricultural, orchard and vegetable crops in Poland, which has been caused, among others by reduced emission of this element from anthropogenic sources, including reduced energy consumption and increasingly more efficient flue gas desulphurization installations, decrease in animal population and therefore diminished production of natural fertilizers without a ballast in which sulphur was present and finally by lower atmospheric pollution falling onto the soil (Przygocka-Cyna & Grzebisz, 2017).

Another cause of sulphur (S) deficiency in field crops is also constantly changing level of this element application by farmers which may be due to quite limited market offer of Polish producers manufacturing typically sulphur fertilizers. In Poland sulphur (S) is most frequently applied in multicomponent fertilizers, which means that the amount of this element in a given fertilizer composition only supplements the other nutrients contained in it. The most popular products used in agricultural production comprise the fertilizers with the following

proportions of sulphur (S) in conversion into elemental form: ammonium sulphate 24%, pulverized simple superphosphate 11.5-14%, potassium sulphate 17%, potassium salt (40% K_2O) 2%, potassium magnesium sulphate 18%, gypsum 17% and kainite up to 7%. Another problem which farmers face is a relatively high cost (in terms of pure ingredient) of fertilizer products which supply easily available sulphur (S) form, which considerably reduces their potential universal application in quantitative terms (Table 4).

Table 4 **Compilation of net prices for the most popular sulphur (S) containing mineral fertilizers offered on Polish fertilizer market in 2016**

Specification	Prices range	
	[PLN · t^{-1}]	[Euro · t^{-1}]
Pulsar - crystalline ammonium sulphate	590.00-680.00	139.00-170.00
Simple superphosphate	605.00-660.00	143.00-156.00
Ammonium phosphate AS21	720.00-760.00	170.00-180.00
Magnesia - Kalinite	730.00-770.00	173.00-182.00
RSM S	650.00-880.00	164.00-208.00
Salmag with sulphur	950.00-1 050.00	225.00-250.00
Saletrosan	965.00-1 050.00	229.00-249.00
Epso Top - magnesium sulphate	1 090.00-1 250.00	258.00-296.00
Polifoska 6-8	1 320.00-1 570.00	312.00-371.00
Wigor S	1 390.00-1 580.00	329.00-374.00
Potassium salt	1 190.00-2 150.00	282.00-508.00
Patentkali - potassium sulphate	1 790.00-1 940.00	423.00-459.00

Source: Author`s calculations based on data of producers and distributors.

High prices of 1kg of sulphur in terms of pure ingredient in ammonium sulphate, superphosphate or saletrosan result in the first place from the fact that these are typical mineral fertilizers whose main task is to supply the soil in basic microelements, i.e. nitrogen (N), phosphorus (P) and potassium (K), whereas sulphur contained in their fertilizer formula may be called a complementary ingredient. Currently, it has been estimated that in Poland net prices for 1 kg sulphur (S) as pure ingredient contained in the most commonly applied mineral fertilizers fall within the rage from 4.50 PLN (1.10 EUR) to 9.20 PLN (2.20 EUR). Therefore, a solution to the problems presented above may be including in the market offer sulphur-calcium fertilizer derived from coal combustion by-products (CBP) in electric and thermal power plants, which would contain 130kg sulphur (S) in one

ton of FDG gypsum and fluidized bed combustion ashes mixture. In conversion to SO_4 it gives about 440 kg S, in conversion to SO_3 about 390kg S and in conversion to SO_2 about 290kg S.

The advantage of this kind of product is a high content of sulphur (S) in a sulphate form, which means that it is best available to plants and does not require any previous processing by soil microorganisms. The suggested fertilizer is also one of the cheaper sources of this element available form, because as demonstrated by the conducted analyses, the 1kg sulphur (S) contained in it costs between 1.2 PLN (0.30 EUR) and 1.90 PLN (0.45 EUR), which causes that it may become an attractive alternative on the domestic fertilizer market. Polish agri-producers increasingly more often compare the prices of offered fertilizers in the context of the calculation of the specific nutrient it contains. It is so, because the cost of 1kg of pure component may prove greatly different, despite the fact that both the market prices and composition of products intended for similar uses for crop cultivation, seem similar. Another advantage of the presented fertilizer may be also its potential application on highly acidified soils, due to its high calcium (Ca) content, which causes that it does not severely affect their pH change.

According to the data from the report entitled: "Studies on de-acidifying fertilizers market in Poland" conducted for Ekotech-IP Ltd Company, there is a big market potential for sulphur-calcium fertilizers derived from CBP. It is in the first place due to popular cultivation of sulphur-loving plants, since their total acreage oscillates around 7 million ha, which may considerably influence the potential annual consumption of this type of product. The data provided by Energetyk-Serwis enterprise (one of the fertilizer manufacturers in Poland) domestic consumption of sulphur-calcium fertilizers in the future has been estimated on the level of 1.9-2.2 million tons. As indicated by the authors of the report, currently these assumptions are realized in about 1%, whereas the data of one of this fertilizer main distributors in Poland, annual sales are on the level of 20-25 thousand tons, whereas in the longer term the sales volume may be doubled ("Badanie Rynku Nawozów", 2015). Similar values were indicated by an assessment of market potential of the studied product conducted on the basis of selected crops (most important for the economy) requirements for sulphur (S) and calcium (Ca) and their cultivation area in Poland (Figure 1 and Figure 2).

Figure 1 **Market potential for fertilizers derived from CBP for maize, rapeseed and agrimony, wheat and barley in the provinces of Poland [thousand t ·ha AL^{-1}]**
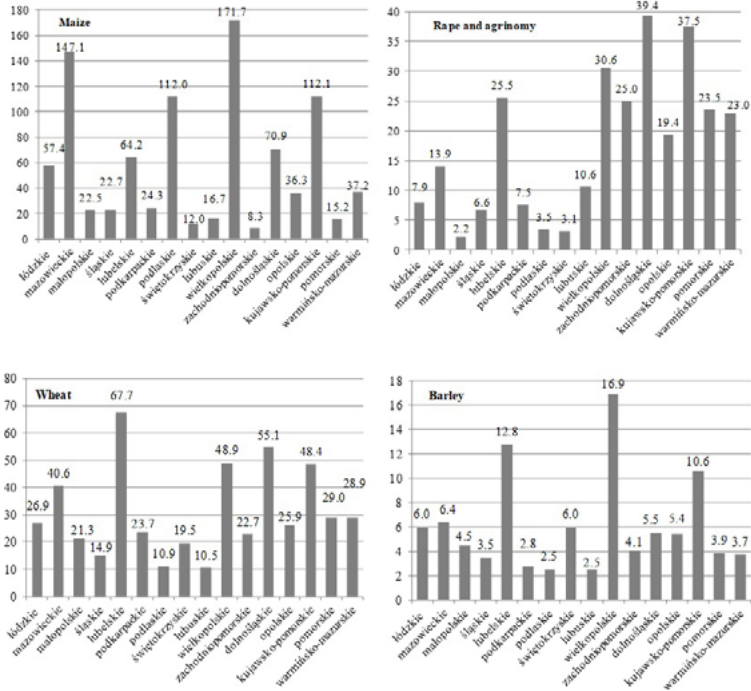
Source: Author's calculations based on data base of Central Statistical Office of Poland. Retrieved from http://www.stat.gov.pl

Figure 2 **Market potential for fertilizers derived from CPB for triticale, oat, potatoes and sugar beets in the provinces of Poland[thousand t ·ha AL^{-1}]**
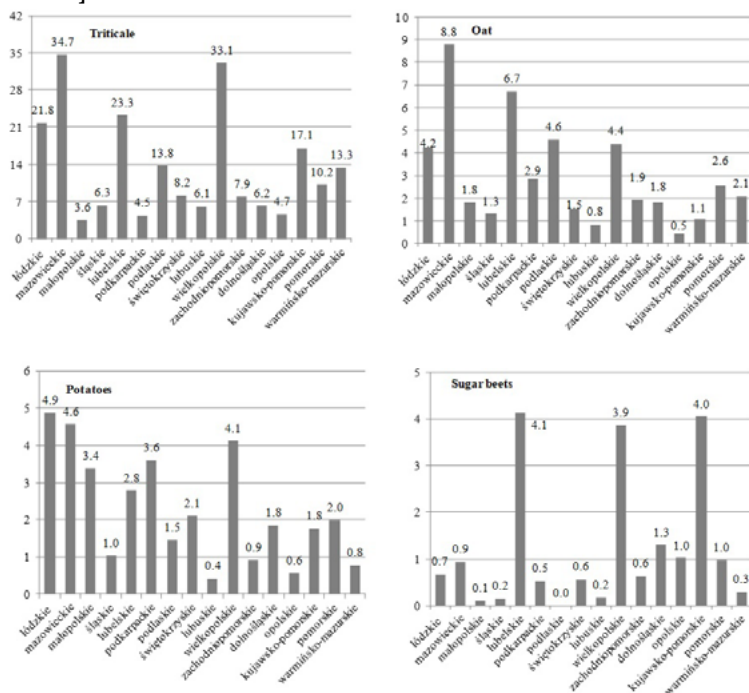
Source: Author's calculations based on data base of Central Statistical Office of Poland. Retrieved from http://www.stat.gov.pl

In the coming years the market potential (sales volume) for sulphur-calcium fertilizers derived from CBP in Poland will concentrate mainly around agri-producers specializing in cultivation of maize, corns (wheat, barley, oat and triticale), rapeseed and agrimony. A potential sales volume, resulting from these crops requirements for sulphur (S) and calcium (Ca) and their cultivation area in Poland is, respectively: maize – 930.6 thousand tons, corns - 853.6 thousand tons (of which 58% wheat, 25.4% triticale, 11.40% barley and 5.5% oats), rapeseed and agrimony – 279.1 thousand tons. The assessment shows also that in spatial (geographical) terms the greatest demand for the product of this type, constituting almost 65% of the total (i.e. about 1.4 million tons) should characterize the eastern region (lubelskie, podkarpackie, podlaskie and świętokrzyskie provinces),

north-western region (lubuskie, wielkopolskie and zachodniopomorskie provinces) and northern region (łódzkie and mazowieckie provinces) (Figure 3).

Figure 3 **Market structures for sulphur-calcium fertilizers derived from CBP in the provinces of Poland**
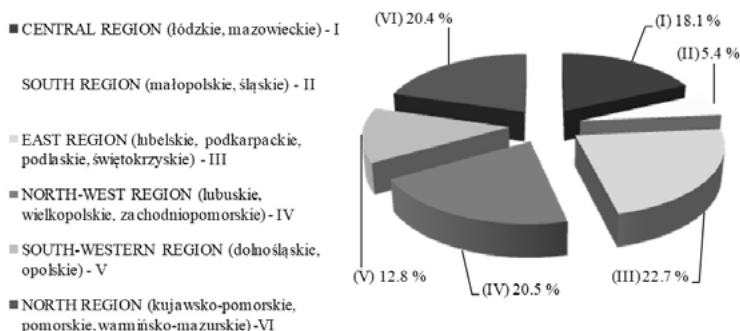
- CENTRAL REGION (łódzkie, mazowieckie) - I
- SOUTH REGION (małopolskie, śląskie) - II
- EAST REGION (lubelskie, podkarpackie, podlaskie, świętokrzyskie) - III
- NORTH-WEST REGION (lubuskie, wielkopolskie, zachodniopomorskie) - IV
- SOUTH-WESTERN REGION (dolnośląskie, opolskie) - V
- NORTH REGION (kujawsko-pomorskie, pomorskie, warmińsko-mazurskie) - VI

(VI) 20.4 % (I) 18.1 % (II) 5.4 % (III) 22.7 % (IV) 20.5 % (V) 12.8 %

Source: Author's calculations based on data base of Central Statistical Office of Poland. Retrieved from http://www.stat.gov.pl

Therefore, the potential (total) demand, calculated on the basis of the methodological assumptions used, on the level of 2.2 million tons is a basis for a greater optimism concerning the sales of sulphur-calcium fertilizers, which may be produced using the by-products of coal combustion in electric and thermal power plants in Poland. However, it should be remembered that it is a strictly theoretical assumption resulting from estimation conducted by means of a methodological apparatus. On the basis of analyses conducted by other authors it may be stated that if about 3-5% of the estimated volume finds purchasers in real conditions, it will give the sales volume of over 60 thousand tons per year, which may prove a great success for the manufacturers of this product. The more so, this is a relatively novel product on Polish market of fertilizers and plant growth stimulators, whereas its manufacturing, due to the origin of production components does not generate high costs. It may affect its future market price and competitiveness towards much more expensive alternative products.

4   Conclusion

The assessment of market for sulphur-calcium fertilizers based on the requirements of crops (of significant economic importance) for sulphur (S) and calcium (Ca) and their cultivation area in Poland indicates a most advantageous development perspective for these products market. It may be assumed that in future

an upward demand trend for sulphur-calcium fertilizers will be observed on fertilizer and plant growth stimulators market in Poland, particularly considering commercial farming. Increasingly more frequently apparent neglect concerning progressive soil acidification and perceivably growing sulphur (S) deficit in agronomic crops will involve a necessity to apply much greater amounts of products for recultivation of arable lands on farms. An additional advantage of the suggested fertilizer is a fact that as a source of bioavailable sulphur (S) it constitutes a much cheaper alternative for the previously used multicomponent means, whose necessary applications in intensive agricultural production involves high costs. Marketing a new sulphur-calcium fertilizer containing bigger amounts of sulphur (in terms of pure ingredient) and some content of microelements for more competitive prices, may prove a good alternative for agricultural producers. The more so, as it is derived from the by-products of another production process, which is important from the market pricing (cost intensity of manufacturing) point of view, because a waste directly becomes a final product. However, it should be mentioned that the presented fertilizer does not significantly impact a change of the soil pH, allows to maintain its proper reaction owing to its property of aluminum (AL) toxicity blocking, which gives it a considerable advantage over competitive products.

Acknowledgements

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NATURAL AND CLIMATIC CONDITIONS AS A RISK FACTOR FOR AGRICULTURAL PRODUCTION IN UKRAINE

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Abstract

The main objectives of the study: to assess the impact of changes in the natural and climatic conditions on the functioning of the agricultural sector in Ukraine; to substantiate the classification of management levels of aggregate economic risks in agrarian business taking into account agroclimatic zonal affiliation; to develop a system of insurance for climate risks.Climate change poses an increased risk for people, capital (economy) and the environment. Risk assessment from climate change is one of the most important bases for any adaptation strategy, because it can help program developers to select and implement the best solutions. While risk assessment is not a new concept and it is constantly used in various socio-economic sectors, the assessment of the risks from climate change is still something unusual.That is important the study of natural and climatic risks and their impact on agricultural production is relevant.

Keywords: *agricultural production, atmospheric precipitation, cclimate change, climatic zones,greenhouse gas emissions, temperature regime*

JEL classification: *Q 12, Q 54*

1   Introduction

The peculiarity of agrarian production is that it is carried out under auspicious, under the conditions of a not-for-profit period and production period, a tangible dependence of the industry on natural, regional, economic, transport, property and other features.

The assessment of the risks of climate change intended to identify the threats that may or may be aggravated by climate change, and to assess their likelihood and consequences in order to properly respond to these threats and reduce their risks. The risks caused by climate change are not static, but rather changeable over time, depending on changes in population size, land use and economic growth or decline. In addition, risks vary in space and have different implications.

According to T. Adamenko, there is a high probability that global warming will lead to deterioration of climatic conditions for 2 million hectares of land. In today's warming and virtually unchanged rainfall, in 10-15 years, part of the territory of Ukraine may become unfit for agriculture (part of the Zaporozhye, Kherson, Mykolayiv and Odessa regions) [5]. According to Ya. Didukh, the cause of climate change is the disturbance of the energy balance of the biosphere and its components - the natural types of ecosystems that arise under the influence of large-scale action of a powerful anthropogenic factor [6]. M. Romaschenko proposed and theoretically substantiated a new methodological approach to the formation of water-saving, environmentally safe irrigation regimes, developed scientific and normative-methodical principles of the organization and conduct of ecological and land reclamation monitoring of irrigated lands, a new concept of protection of agricultural land and rural settlements from flooding, flood and flooding processes [8]. The main reasons for the low returns of land potential in Ukraine are landlessness, lack of a real owner, a false strategy of maximizing land use for cultivation, imperfect machinery and technology for land cultivation and agricultural production, unmatched price policy, non-compliance with scientifically sound farming systems, L. Didkovska [9]. Development of many phytophagous insects is closely related with host plant phenology Bale et al. [10] that is mainly regulated by temperature conditions in the environment. The same factor, such asaverage temperature increase, can influence differently on plants and phytophagous insects. Examples of negative influence of climate changes are described, e.g. resulting from disruption of synchronisation of important processes occurring at different trophic levels of the ecosystem. But the research remains poorly assessment of the level of natural and climatic factors taking into account the regional aspect.

2   Data and Methods

During the research were used statistical data from the State Statistics Service of Ukraine (data from 1995), the State Hydrometeorological Center of Ukraine (data from 1900), methodological publications and annual reports of Eurostat, Ministries and departments of Ukraine (data from 1991), own results of scientific

researches of the author, reference and information publications, Internet resources, etc. In the process of research, the following methods of scientific knowledge were used: logical-analytical methods, in particular methods of analogy and comparison, induction and deduction, scientific abstraction – for theoretical generalization, clarification of the conceptual apparatus on the problem, formulation of conclusions; method of expert assessments – in determining the factors of climate risks of an agricultural enterprise and conducting an assessment of the effectiveness of the risk management system; experimental game techniques, in particular the method of game theory, – to determine alternatives when choosing the behavior of the enterprise in different situations of uncertainty; linear programming method – for predicting climatic risk.

3   Results and Discussion

Climate change poses an increased risk for people, capital (economy), and the environment; Risk assessment from climate change is one of the most important bases for any adaptation strategy, because it can help program developers to select and implement the best solutions. While risk assessment is not a new concept and is constantly being used in various socio-economic sectors, the assessment of the risks from climate change is still something unusual. In particular, the assessment of the risks of climate change aims to «identify the threats that may or may become more severe from climate change, and assess their likelihood and their consequences in order to properly respond to these threats and reduce their risks». The risks associated with climate change are not static, but are likely to change over time, depending on changes in population size, land use and economic growth or decline.

Risk assessment can be qualitative and quantitative. Quantitative assessments focus on the calculation of the probability of certain effects and possible losses from them, where the risk = probability of danger x potential losses. This formula reflects a more detailed description of risks and uncertainties. In general, quantitative estimates take a lot of time, as well as large volumes of data with a high degree of technical expertise. While a quantitative risk assessment can become a powerful tool for adaptation decisions, it cannot be performed without a broad, qualitative assessment.

Since 1989, Ukraine has been experiencing an almost continuous period of warming – the average annual air temperature increased by almost 0.9 ° C, in 75% of cases it was 0.8-1.5 ° C higher than normal [1]. That led to changes in the rhythm of seasonal phenomena – spring floods and snowfall at the beginning of flowering; Also, extreme weather phenomena became more frequent, which in

general impacted on the economic results of the economic activity of agricultural producers (floods on the Danube in 2005, the Dniester and the Transcarpathia in August 2008, droughts throughout Ukraine in 2007, record snowfalls in the west and in the central part of the country in March 2013 and in December 2009 in the south) [2].

The arid years have become more frequent as compared to the first half of the twentieth century, indicating a significant change in the climate. In arid years, the yield of grain, not only late and early spring, but also winter grain crops, is reduced too much. In this region, the probability of their onset is already high. In particular, different intensity of drought in the steppe zone of Ukraine was observed in 1907, 1916, 1920, 1921, 1923, 1934, 1940, 1948, 1951, 1954, 1957, 1968, 1975, 1981, 1983, 1986, 1992, 1994, 1997, 2007 years Drought was very strong in 1922, 1946, 1954, 1994, 2003, 2007 and 2009. Statistics show that in 110 years there were recorded more than 70 droughts, too strong – in 1891, 1901, 1911, 1921, 1922, 1938, 1939, 1946, 1957, 1959, 1963, 1965, 1968, 1972, 1975, 1979, 1983, 1992, 1996, 1999, 2003, 2007. Drought was severe in 1891, 1921 and 1976. Between 1956 and 2005, there were 60 droughts that covered more than 10% of the area and had a significant intensityю During the years of independence in Ukraine there were 10 droughts: 1992, 1994, 1996, 1999, 2000, 2002 (in the Crimea), 2003, 2005 (second half of the year), 2007, 2009. In their observations, M. Barabash and T. Korzh noted that 1999, 2001, 2007, 2009 were the warmest in 100 years. In those years, 11 of the 12 months were abnormally warm [3].

In the first decade of the twenty-first century. The drought of 2007, which covered a considerable area of the steppe zone of Ukraine, was very strong. In this huge area in April-May and early June there was no precipitation for 40-50 days. The negative impact of drought has intensified by a very dry autumn and abnormally warm and almost snowless winter. Therefore, it is believed that in this zone of drought – not an accident, but ordinary, often repeated, natural phenomenon. As it is known, the inhibition of crops begins in the absence of rains for more than 25 days on all types of soil, it increases in the absence of them for 30-40 days, and in the long run, cereal crops, perennial and perennial grasses and other cultures with a short vegetative period suffer from drought .

Based on available information, has developed criteria for assessing drought. These criteria eliminate the shortcomings of criteria developed earlier, in which there are no measurable indicators and characteristics of drought (Table 1).

Table 1 **Extended criteria for determining drought**

Elements of drought evaluation	Intensity of drought	Indexes
The duration of the dry period (in the absence of effective rainfall of more than 5 mm per day) – the number of days	Weak	20-25 days
	average	25-30 days
	strong	30-35 days
	too strong	more than 35 days
Rainfall per month in% to multi-year level	Weak	81-90%
	average	61-80%
	strong	41-60%
	too strong	40% or less
The presence of productive moisture in the soil in a layer 0-20 cm	Weak	16-20 mm
	average	11-15 mm
	strong	5-10 mm
	too strong	less than 5 mm (for 3 decades)
The presence of productive moisture in the soil in a layer 0-20 cm	Weak	91-100 mm
	average	71-90 mm
	strong	51-70 mm
	too strong	less than 51 mm
Relative humidity of air is less than 30%, with air temperature +25 ° C and above and wind speed more than 5 m / s (dry), the number of days per month	Weak	3-4 days
	average	5-9 days
	strong	10-14 days
	too strong	more than 14 days
Hydrothermal coefficient for the estimated period	Weak	0.6-0.8
	average	0.4-0.6
	strong	0.25-0.4
	too strong	less than 0.25

Source: Barabash, MB, Korzh, T.V., Tatarchuk, O.G. (2004). Research of changes and precipitation fluctuations at the turn of the XX and XXI centuries. in conditions of global warming the climate

The refined criteria make it possible to evaluate the drought comprehensively and comprehensively, their use for a long period provides a reliable assessment of the intensity of drought and its consequences for most crops, as well as for the calculation of expected losses. The necessity of determining the independent

weather indicators of drought for the development of parametric insurance schemes in Ukraine is substantiated. The development of parametric insurance schemes for crops against drought risk, in particular in its northern grain-growing regions, requires the initial identification of independent weather indicators for the manifestation of this risk. In parametric insurance schemes, independent weather indicators act as indices that determine the fact of the occurrence of an insured event.

According to the scientific forecasts, an increase in the average annual temperature of 1 ° C causes a 10% reduction in agricultural output, and the projected increase in the average annual temperature of 1-3 ° C in the near future will have a major impact on cereal production [4]. Meanwhile, agriculture, in turn, contributes its own share in the global warming of greenhouse gases from industrial activities in this area.

According to the Ukrainian Weather Center, compared with 1961, the duration of the winter period has decreased for almost a month. Only some winters, for example 1985, 1987, 1997, were extremely cold and snowless, then winter crops faded in large areas. In the winter of 2002-2003, due to the prolonged occurrence of a powerful ice crust, about 70% of crops were killed [5].

Since 2000 there has been a tendency to increase the temperature in the summer, which is threatened by an increase in arid phenomena [6].

Changes in the temperature indices of the cold period and in the temperature regimes in the spring, starts the begin of the sowing campaign in recent years for 2 weeks earlier. There is a slight decrease for precipitation throughout Ukraine, which adversely affects the formation of sufficient soil moisture and promotes the spread of droughts to the northern regions of Ukraine. In the last decades, the actual displacement of the boundaries of natural-climatic zones is 100-150 km to the north [7]. Changing natural and climatic conditions leads to a change in the structure of the crops area of the main crops (Table 2).

Table 2 **Structure of crop area in agricultural enterprises of Ukraine (%)**

Zone	The name of cultures	1961-1970	1971-1980	1981-1990	1991-2000	2001-2014
Steppe	including crops	50,13	47,58	51,03	46,81	57,29
	winter wheat	21,69	25,97	20,36	10,67	24,82
	sugar beet	1,42	1,29	1,25	1,74	0,06
	sunflower	10,74	11,12	9,25	11,30	28,77
	others	37,72	40,01	38,47	40,16	13,88
	Total	100	100	100	100	100
Forest-steppe	including crops	51,30	49,80	50,86	45,32	54,76
	winter wheat	27,09	22,33	20,10	18,26	24,04
	sugar beet	12,83	12,23	11,60	11,76	3,18
	sunflower	2,09	2,15	1,73	3,08	7,00
	others	33,77	35,82	35,80	39,84	35,07
	Total	100	100	100	100	100
Polissya	including crops	48,01	43,58	42,49	44,47	52,35
	winter wheat	16,48	12,82	17,26	19,11	28,17
	sugar beet	7,44	6,64	5,02	4,72	1,78
	sunflower	0,00	0,00	0,00	0,00	0,06
	others	44,56	49,78	52,48	50,81	45,81
	Total	100	100	100	100	100

Source: Adamenko T.I. (November 22, 2013). Climate change and its impact on agro-climatic resources of Ukraine. Presentation at the round table «Development of agrarian production in conditions of natural and climatic changes»

The main feature that characterizes the change in the structure of sown areas, caused by natural and climatic conditions, is the growth of sunflower crops in the farms of the forest-steppe and Polissya.

Reducing the amount of precipitation and increasing the average daily temperature creates unfavourable conditions for growing sugar beets. Thus, over the past 50 years, the share of their crops in the enterprises of the corporate sector in the Steppe zone has decreased by 1.32 pp. Similar phenomenon was observed in the forest-steppe zone [8].

Our research has found that the result of the influence of natural and climatic conditions on the cultivation of agricultural crops became significant fluctuations in their yields.

According to the results of the conducted studies, significant decline in winter wheat yields was observed until 2000 1-2 times per decade. In the first decade there were three significant crop yields.

The most significant indicator characterizing the impact of climatic conditions on cultivation is the variation of the mean linear deviation. Based on the data in Figure 1, the calculation of the levels of the above-mentioned indicators (Table 3) was carried out, which shows an increase in the value of the indicator of the magnitude of the variation of the dynamic rows of wheat yield on average more than twice.

Table 3 **The magnitude of variation and variation of mean wheat yield in agri-cultural enterprises**

Zone	Value	1961-1970	1971-1980	1981-1990	1991-2000	2001-2014
Ukraine	Swing variation	8,9	8,8	14,6	16,9	24
	Midline value	0,07	0,3	0,1	-0,7	-0,01
Steppe	Swing variation	14,4	17,3	21,6	22,3	27,2
	Midline value	0,03	0,6	0,1	-0,8	-0,02
Forest-steppe	Swing variation	15,5	17,6	18,3	21,3	29,7
	Midline value	0,06	0,6	0,1	-0,9	0,01
Polissya	Swing variation	9,7	10,7	11	13	12,6
	Midline value	0,03	0,2	0,1	-0,4	0,08

Source: Author's development.

Changing yields in time depends on many factors, which are divided into three groups: soil, weather and technology of production of crop. By the nature of manifestation, all factors are divided into two groups: deterministic and random [9]. Deterministic is the degradation of soil, technology improvement and climate change. Incidental factors include, for example, the average weather conditions during the growing season, events that are stressful to plants (short-term

droughts and frost, plant diseases and pests, grassland vegetation), as well as the uncertainty of counting yields that are of a random nature.

Since yields depend on random factors, yields are a random process for describing which uses two concepts of a single event (yielding one year) and the implementation of a random process (a series of individual events that were registered at a certain interval time). So, data on yield over a number of years is the realization of a random process. It is very important that it is unknown what kind of realization will be in the future.

Since the full yield characteristic (as a random variable) is its probability distribution function, the solution of the problem of estimating the effect on the yield of deterministic and random factors is reduced to finding this function.

The yield increase, that is, the trend, is described by the linear regression equation: $y = 0.1784x - 326.69$, where x is the time, year; y – yield, q ha -1.

Determination coefficient R2 = 0.2068. In Figure 1 a straight line represents this equation.

Figure 1 **Dynamics of wheat yield in Ukraine**
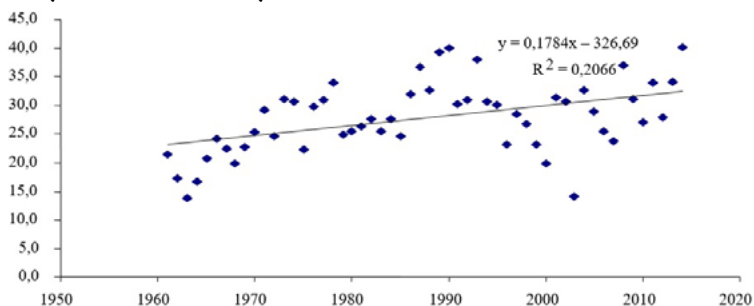
Source: Author's development.

Trend is treated as the influence of deterministic factors. In this case, it is the progress of technology, which is associated, for example, with the increase of fertilizer doses, with the use of plant protection products and using more productive varieties, which leads to higher yields. The degradation of the soil, which aggravated its agronomic properties and quality, on the contrary, leads to a decrease in yield. As yields grew, the effect of technological progress was more on the effect of soil degradation. This means that the technological cost of growing crops can be divided into two parts. The first part offset the decline in yield due to degradation (the more soil degraded, the more costs were needed to compensate for the effects of degradation). The second part provided for an increase in yields (these costs also increased).

A deviation from the trend is interpreted as the effect of random factors. Y yield was represented by the dependence $Y(x) = Y_{trend}(x) E$, where E is the relative yield (relative to the trend), taking into account random factors. For each year, the values $E_i = Y_i / Y_{trend}(i)$, $i = 1, 2, ..., 55$ – serial number of the year were calculated. Here Y_i is the actual yield in the x-th year, and the $Y_{trend}(i)$ is calculated on the trend equation of yield in the same year. The application of a number of values $\{E_i\}$ of the Kolmogorov-Smirnov and Student criteria has led to the conclusion that at the 5% level of significance, the hypothesis about the truncated normal distribution of the random variable E with the mean value of $E_{environments} = 1$. The values of the standard deviation and the coefficient of variation levels, respectively, $y_E = 0.13$, $e_E = 13\%$. According to the theory of probability it follows:

1) the absolute yield Y is also described by the truncated normal distribution; its average value of $Y_{environment}(t) = Y_{trend}(t)$, that is, the trend describes the dynamics of average yield;

2) standard deviation for absolute yield $_y Y(t) = Y_{trend}(t) _y E$; 3) for the absolute and relative yield, the coefficient of variation is the same, that is, $_e Y = _e E$.

In Figure 1 coefficient of variation characterizes the distribution of points in relation to the trend line: the smaller the value of the coefficient, the smaller the spread, that is, the less impact of random factors. Consequently, the coefficient of variation can be used as an estimate of yield stability in relation to the influence of random factors. The smaller it is, the higher is the yield stability. Since the normal distribution is determined only by the mean value and the standard deviation, this means that the desired probability distribution function for the yield has been found, and at the same time it was possible to separate the effect on the yield of deterministic and random factors.

In Figure 1 linear trend of productivity growth can not last indefinitely. The time will come when losses from soil degradation will be higher than productivity gains at the expense of technology. Then the productivity growth will slow down and may come a moment when the trend will reach the maximum, after which the yield will begin to decline. In the future, with the decrease of humus stock, the average yield will decrease. This confirms the real danger that the trend shown in Figure 1, can reach the maximum, after which the yield will decrease.

It should be noted that the minimization of the negative influence of weather risks in accordance with the processed results of the survey of agricultural producers is mainly carried out through insurance of crops (30%) and insurance of expenses (6%). However, the vast majority of respondents (64%) do not take any action on weather risk management at all, either because of lack of funds or lack of need.

In our opinion, to minimize the risks of farming, especially in unstable climatic zones, are needed new methods and approaches to manage the state of land resources, in particular soil fertility, optimization of productivity of cultivated crops with concrete proposals, how, where and when to grow and by which technologies [10].

Based on data on the vulnerability of agricultural crops to climate change, diseases and pests, we should target selection work for the withdrawal of crops resistant to changes in weather conditions and diseases. Particular importance in resolving issues of adaptation of plant growing to climate change becomes selective for ecological plasticity, which makes it possible to obtain stable and high yields under different vegetation conditions and adapt different types of plants under cultivation in adverse climatic conditions, making them more resistant to various weather events and harmful insects. For example, China, as the world leader in the production of wheat (the share of the country in world production is about 20%), its achievements in this are obliged to breeding varieties. The withdrawal and improvement of new varieties of wheat allows Chinese farmers to achieve a yield increase of an average of 1.5% per year.

As a direction of domestic agrarian enterprises adaptation to global climate change can become use: without-field cultivation of soil, which holds moisture in the soil, improves the availability of water, reduces soil erosion, increases water content; the introduction of agricultural production of alternative agricultural models borrowed from foreign experience in particular, Mini-Farming (Biointensive Mini-Farming), Biodynamic Agriculture, Effective Microorganism Technologies, LISA – Low Input Sustainable Agriculture), based on a deep understanding of the processes occurring in nature, aimed at improving the structure of soils, reproducing their natural fertility and contributing to the formation of environmentally sustainable agro-landscapes [11].

The offset is in the time of sowing, and accordingly, of all other stages, depending on the weather conditions. Some farms, using the fact that the harvest ends earlier, until the winter crops have time to carry out additional operations to feed and control the weeds, including hanging side rates.

Use of seeds resistant to drought and high temperatures of varieties or hybrids. There is a widespread practice of annual purchases of corn and sunflower seeds from international companies, while wheat and other crops are often of Ukrainian origin. One way or another, but one can say with certainty that when choosing seed material Ukrainian agrarians consider its resistance to climatic factors.

Due to adverse weather conditions (strong winds, temperatures), some farms carry out work at night, when their execution can be more convenient or more efficient [12].

I must say that Ukraine has a strong scientific and practical base for the development of adaptation strategies for climate change, taking into account the specific features of our region. In particular, such work is being carried out, there is a significant interest in its development in the Ukrainian Research Institute of Prognostication and Testing Technology, and Technologies for Agricultural Production named after Leonid Pohorilly.

Thus, global warming in Ukraine in the coming years will have both a positive and a negative impact on agriculture. This effect will be different in different agro-climatic zones – increasing the length of the growing season in the northern part of the country will be positive for agriculture, in the southern part of the country, on the contrary, it will lead to an increase in droughts. The consequences of climate change are inevitable not only for the main agricultural crops, but also for horticulture, viticulture in Ukraine [13].

About two approaches to insurance – the weather index and the index of productivity.

The first one – not popular, but cheap, requires one-time significant costs and insignificant current.

The second one is being implemented, but it always needs material and human costs.

In our opinion, it is necessary to convince insurers of the possibility of an objective and sufficiently accurate assessment of possible losses using various hydrometeorological information and expert assessments. Moreover, over time, these opportunities will be improved.

The basis of the proposed insurance product is the level of intensity of manifestation of this insurance risk in accordance with the methodology proposed above. Lack of yield is compensated if the yield is below a certain level (trigger), which is set for all regions in accordance with the technology of grain production.

The task of an expert is to determine the expected (biological) yield. If the yield falls below the level specified in the contract, the insurance company pays the indemnity. In addition, the compensation is paid automatically, that is, without conducting a field survey, if the deficiency of precipitation during the growing cycle is less than 55% of the norm. To calculate the rainfall rate, is used data for 30 years.

Inspection and analysis of crops are necessary to determine the loss of crop due to drought, as well as to determine the decline in yield under the influence of other factors. The main parameters are fixed: rainfall: 10% of the deficit; plant density; the presence of pests and diseases; non-compliance with the requirements of culture production technology.

The determination of yields is carried out in four stages, starting with the phase of waxy maturity (XI stage of organogenesis by F. M. Kuperman): the selection of random ears on a plot of 1 sq.m; weighing of ears from the point of sampling (weight of ears from 1 sq. m); determination of grain moisture content,%; determination of yield, kg / ha.

The main condition of the contract is the level of franchise. It is proposed, that for a very severe drought, according to the proposed classification, its level is 0, strong – 75%, average – 50%, weak – 25%. This value is intended for agricultural enterprises of the steppe zone. For the forest-steppe and Polissya zones, it will be adjusted to the magnitude of the drought index calculated by A.V. Meshchersky and V.G. Blazhevich on the territory of the distribution of this natural phenomenon.

The cost basis for determining the insurance indemnity will be the level of procurement prices for the main channels of marketing for certain types of grain crops at the time of conclusion of the contract. As the analysis of a possible manifestation of drought with the degree "too strong", the size of losses in this case are beyond the capabilities of the commercial insurance market. Therefore, this risk is not covered by insurance programs. In this case, a multi-disciplinary program should be in place, which will be part of the state subsidy for the production of agricultural products in areas of increased risk-taking in agriculture.

The use of this insurance product would compensate the losses incurred by agricultural enterprises for UAH 3600 million, which in a natural equivalent is equal to 4 million tons of grain crops. The state reimbursed UAH 400-500 million.

4 Conclusions

It is determined that global warming in Ukraine in the coming years will have both a positive and a negative impact on agriculture. This effect will be different in different agro-climatic zones – increasing the length of the growing season in the northern part of the country will be positive for agriculture, in the southern part of the country, on the contrary, it will lead to an increase in droughts.

The consequences of climate change are inevitable not only for the main crops, but also for horticulture, viticulture in Ukraine. Due to the fact that the climatic risks have become more and more often the task of developing effective insurance products based on the weather and productivity index.

To effectively use the received heat resources, to reduce the risks of further temperature increase, it is necessary to develop and implement a system of adaptation measures, namely: introduction of water-saving irrigation technologies, creation of new drought tolerant varieties and hybrids, formation of stable

agro-ecosystems, capable of functioning under more severe climatic conditions. In addition, the necessary ecological optimization of the structure of landscapes and land use systems based on the reduction of agricultural land cultivation, minimization of degradation processes and reproduction of soil fertility by achieving a deficit-free balance of humus and biogenic elements in agro ecosystems, the development of effective systems for protecting plants from pests and diseases.

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THE ORGANIC FOOD MARKET IN POLAND – OBSTACLES AND DEVELOPMENT OPPORTUNITIES IN RETAIL

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Abstract

The aim of the paper is to present and discuss the state of organic food market in Poland as well as limitations and opportunities for further development of the market, occurring in the retail sphere. The condition of the organic food market in Poland was characterised in the paper as well as the results of the research conducted between 2011 and 2012 on retail of organic food. The study covered 131 specialist shops, 109 general grocery outlets and 179 supermarkets. The investigation proved that only part of the specialist stores offered complete organic food product range. One of the obstacles of the improvement of the retail sphere is weak offer of the providers and dispersion of producers and distributors. Collaboration between retailers and other distribution sphere participants may contribute to the overcoming the developmental barriers.

Keywords: *development,market, obstacles, opportunities, organic food, product range, pricing policy, retail, supply sources*

JEL classification: *D22, M31, Q13*

1   Introduction

Poland has good conditions for development of organic farming and therefore this production method may become a significant element of further sustainable development of rural areas. First, organic farming is labour consuming and

it could maintain part of workplaces on rural areas. Second, obtaining higher prices for organic products and subsidies to organic area contributes to growth of farmers' incomes. Third, Polish organic food has export opportunities on the European market, because of competitive advantage resulting from lower production costs.

Organic farming in Poland has been developing since the 90's of the last century. Introduction of subsidies to the inspection cost in 1998 and to organic area in 1999 caused increase of interest in organic production methods. A significant growth occurred in 2004, when Poland joined the EU and organic farmers had the opportunity to use wider support in frames of agrienvironmental programme. At that time, the organic area increased significantly. In spite of some decline in recent years, in 2016, 22 435 farms ran organic production on the area of almost 537 thousand ha (Figure 1).

Figure 1 **Organic area and number of organic farms in Poland between 1998 and 2016**

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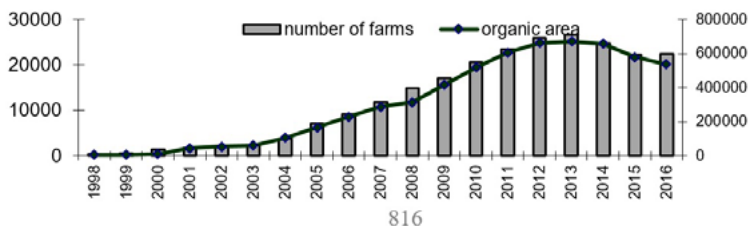
Source: Author's own elaboration based on AFQI data.

Despite the progress on the supply side, production volume and the offer in retail remained quite narrow. On the other hand, consumers look for diverse product range with the low prices, respectively to the incomes. The solution to this problem is effectively functioning organic market that would justify further development of organic methods in agriculture. Meanwhile, the market is still in the initial stage of growth.

The value of organic market in Poland in 2015 was estimated at 167 million euro and is supposed to reach 250 million euro in 2017. Moreover, it is only 0.5% of the entire food market in Poland (in 2016) (IMAS International, 2017) – for comparison in Denmark it is 8%, in Austria 6.5 % or Switzerland 6.9% (Juhl, Fenger andThøgerson, 2017). It results from the fact that high growth dynamics of organic area in Poland has not resulted in high dynamics of supply volume increase. Significant part of the converted farms does not deliver goods on the market. Additionally, domestic production is characterized by low level of

processing. In 2016 only 705 companies processed organic food, therefore imported processed products have great share in the offered product range, which results in higher price level. Moreover, a problem of organic food market is the fact that organic farms are dispersed all over the country, which is accompanied by lack of solutions assuring efficient flow of products.

The prices for organic food are much higher than the prices for the conventional ones. The price premiums are different for diverse product groups – they range from a dozen in vegetable and cereal products to a few hundred in case of highly processed products (Łuczka-Bakuła & Smoluk-Sikorska 2010). It hinders the organic food market development, because price is still the most important factor in purchasing decisions of the Polish consumers, although their awareness is growing. The most important motives of organic food purchase are healthiness, environmental protection, food safety and higher quality of food (Bryła 2016). In Western European countries, prices play less significant role and more important are environmental issues. Apart from the motives, the consumers in these countries spent much more from their budgets on organic food (O'Doherty Jensen, Denver, and Zanoli 2011, Średnicka-Tober, Kazimierczak and Hallmann 2016).

As far as distribution sphere is concerned, direct selling to individual consumers has been so far the most important distribution channel on the Polish organic food market, because it generates lower costs and margins, due to which it is possible to offer products at competitive prices. Simultaneously the risk of damage and decay of products is lower. Direct selling to individual consumers is profitable, but on condition that farm is located in the neighbourhood of main markets such as agglomerations. It is gainful for both consumers and producers, although it requires diverse product range and good storage conditions on farms. However, a disadvantage of this form of selling is the fact that it occurs only on rural areas. Therefore, it involves more engagement on the customer side (e.g. transportation) (Czubała, 2003).

The results of research conducted by Każmierczak & Zgiep (2013) on producers organic fruit confirm that direct selling is the most common distribution channel, particularly in case of pome and stone fruit. Although in the farmers' opinion it is the most important selling option, the highest demand occurs in large cities, where buyers hardly have access to organic farms. Moreover, consumer studies indicate that specialist shops and supermarkets are the basic supply sources of organic food in cities and other forms are of little importance (Łuczka-Bakuła, 2007, Pilarczyk & Nestorowicz, 2010).

Nevertheless, in most European countries, organic food has become an important segment of retail in recent years and it has moved from niche to mainstream markets (Jones, Clarke-Hill, Shears and Hillier, 2001). Supermarkets are

currently the main distribution channel of organic food. The market share of retail networks in total sale of organic food is in the interval between 60% and 90% in Austria, Belgium, Croatia, Czech Republic, Luxembourg, and the UK. In Italy, France, Germany and the Netherlands the organic food offer share ranges between 40% and 60%, because in these countries traditional organic retailers (specialist shops) are still important market participants (Meredith & Willer, 2016).

This situation is a consequence of the advantages of supermarkets. They sell at lower prices, offer a wide product range, have sufficient space, good equipment and may conduct promotion actions (Richter & Hempfling, 2003; Pilarczyk & Nestorowicz, 2010). On the other hand, shallow and incomplete product range, low environmental awareness and knowledge on organic food among the selling staff, may be recognised as their downsides (Doležalova, Pícha and Navratil 2009).

Supermarkets may be efficient market players on mature markets of organic food. They require supplies of homogenous quality and large quantities. In Poland this may be a problem, because organic food is produced in small farms in low volumes, therefore the resources of supply are limited and unstable. Consequently, large retail networks very often import organic food, which results in relatively higher prices (Wier & Calverley, 2002).

Nevertheless, in countries like Poland with immature organic food markets, large share of organic food is still sold thorough specialist shops (Atănăsoaie, 2011). Specialist shops are important for consumers, who expect close contact with salespersons. They require from the staff full information on organic products. Moreover, specialist retailers have to be innovative, develop new concepts, improve their offer and attract new customers, so that they could compete with supermarkets (Santucci, Marino, Schifani and Zanoli 1999). Moreover, according to the report of the Global Agricultural Information Network (2016) a major driver for the increase in organic food sales was the development of specialist stores in recent years.

The number of specialist shops is estimated at over 1000. Currently in big cities, one may observe a growth of units dealing with organic food only. These are generally self-service stores that assure satisfaction of almost all consumers' needs; however they offer much higher prices than supermarkets. Some specialist shops also run internet sale. In countries with mature organic market, supermarkets have become the main distribution form. Recently in Poland this retail form, as well as grocery stores, have been becoming more and more active participants of the organic market.

2   Data and Methods

The objective of the paper is to discuss the state of organic food market. The paper also aims to indicate opportunities and obstacles for organic food market development occurring in the retail sphere.

In order to achieve this goal, between 2011 and 2012, the research on retail units dealing with organic food was conducted. It covered 131 specialist stores, 109 groceries and 179 units of retail networks. The investigated shops were located in the eight largest agglomerations in Poland, i.e. Warszawska, Górnośląska, Krakowska, Łódzka, Wrocławska, Poznańska, Gdańska and Szczecińska agglomeration. The units were chosen using purposive selection (each unit offered at least three different organic product groups). The research was carried out in form of in-depth interview based on standardised questionnaire (Paper and Pencil Interview method, i.e. "face to face" questionnaire interview allowing to include more complex questions in the form) and covered such problems as organic food product range, supply sources, marketing tools and strategies as well as pricing policy.

The review of the literature concerning organic food market was conducted in the paper. The data concerning organic farming in Poland between 1998 and 2016 provided by Agricultural and Food and Quality Inspection were used as well. Basing on the literature review and obtained data, the methods of rational economic reasoning were applied, including induction, deduction method, comparative analysis as well as the analysis and critics of literature.

3   Results and discussion

The investigated outlets in Poland differed in width of the offered product range. Much broader assortment occurred in specialist shops, because over 57% of them had more than 200 different organic products (Figure 2). It is worth mentioning that in 2/3 of the specialist outlets, the organic offer constituted at least 80% of the all available products. As it comes to general groceries, the stores offering up to 100 articles (over ¾) dominated. None of the groceries had over 200 organics. In the retail networks, the most units offered between 200 and 300 organic articles, but it was only a small part of their whole assortment.

Figure 2 **The structure of the investigated outlets in regard to the size of the assortment offer (%)**
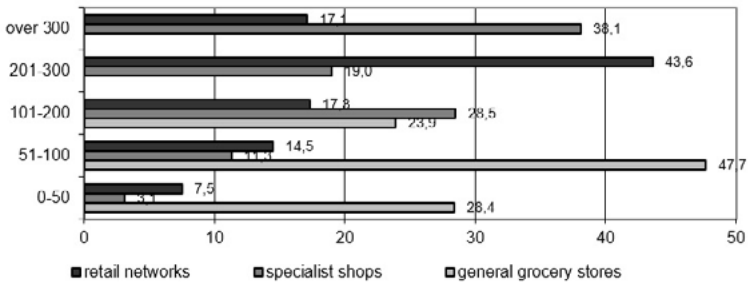
Source: Author's own research.

As it comes to the width of the product range, the most specialist outlets offered cereal, fruit and vegetable products, dairy and spices. In turn, in grocery units, cereal fruit and vegetable product as well as spices mostly occurred in the assortment. In retail networks processed products dominated and hardly any network had fresh products, i.e. vegetables, fruit and sausages, whereas none of them offered meat. The deepest assortment occurred in case of spices, cereal, fruit and vegetable products and the shallowest – in meat and sausages, wherein the offer of the specialist shops was much deeper than in the other types of retail units. Such assortment structure is determined by processing of organic food, because the most organic processing companies deal with cereals, fruit and vegetables, whereas the least with meat. Insufficient number of this type of processors contributes to the appearance of market lacks. It is not a favourable phenomenon from the point of growing consumer interest in organic meat (Łuczka-Bakuła 2007). However, specialist distributors make some efforts to remove this obstacle hampering the organic food market development and try to satisfy the demand. This engagement causes that the price for the wanted products, such as organic meat is much higher than the conventional one (price premiums amount to a few hundred percent) and only consumers with the highest incomes can afford it.

The retailers of organic food see the problem of lacks in their offer. Almost 70% of the investigated specialist and general grocery outlets claimed that sometimes there is a lack of some wanted products (Figure 3). Only in the opinion of every fifth specialist retailer, their offer completely satisfies consumers' needs, whereas in over 1/3 grocery outlets often or very often there is a lack of wanted products. The frequency of lacks leads to discouragement and dissatisfaction of clients. Therefore, the retailers tried to fulfil the purchasers' needs. About ¾ specialist shops and ¼ groceries made individual orders for customers.

Figure 3 **Level of product range complexity of the inquired outlets (%)**
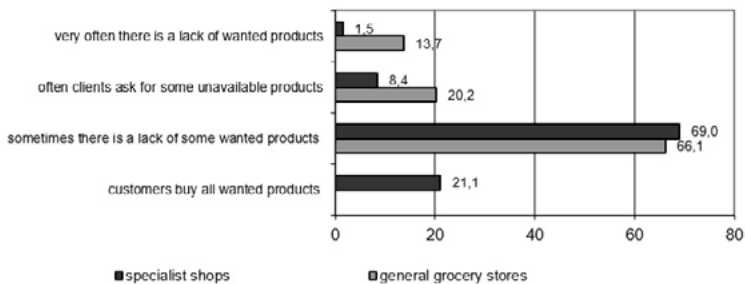
Source: Author's own research.

The retailers were also asked about the main reasons for shallow assortment of the organic food. They named limited offer of the suppliers and high price of the organics. The specialist retailers paid more attention to the seasonality of the supply and growth of consumer interest. The first factor originates from the necessity to assure wide assortment of the organics and their seasonal lacks in the suppliers offer. It is linked with the need for seeking for alternative supply sources as well as with higher costs and more distributors' engagement. For the retail networks lack of consumer interest and high price are the most meaningful. Quite significant reason is also limited offer of suppliers, which originates from the fact that generally, supermarkets are not active participants of the organic food market and therefore they have only a few, but stable, providers of organic food.

A fact that almost 93% specialist shops, over 60% general grocery stores and 56% units of retail networks aimed to widen their product range in future, which may be perceived as a factor for further market development. However, they condition that with particular factors, such as demand growth, price decrease and wider offer of the suppliers (Figure 4.)

Figure 4 **Factors determining widening of the organics offer**
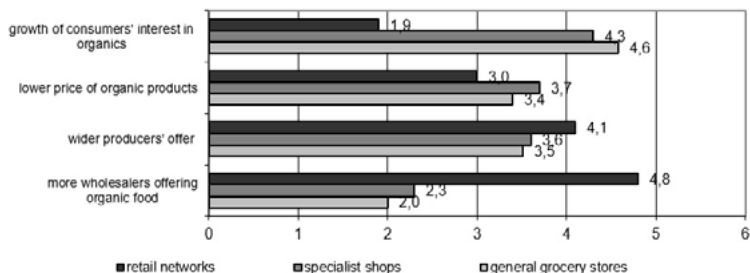
The surveyed retailers assigned ranks from 1 to 5 depending on importance of the option
Source: Author's own research.

A retailer has two ways of supply: directly from producer or through other trading companies. The study proved that they mostly use indirect purchase, which was supply at wholesaler's, particularly in case of processed products and less in dairy, fruit and vegetables or eggs. However, on the other hand, specialist outlets and groceries bought fresh products on farms. Processing companies were also quite important providers in direct purchase. Producers' groups, which deliver products regularly, have some significance for retail networks. In relation to this advantage, producers' group should play more and more significant role on the Polish organic market, similarly to the Western Europe.

The investigated distributors appreciated broader offer of wholesalers, compared to farmers and the fact that they are not very distant. Farms were the second important source of supply for retail stores. In turn, the most important advantages of purchase on farm were freshness of products and confidence in provider, which results in maintaining collaboration with farmers. Processors (fruit and vegetable processing plants, cereal processing plants, bakeries, meat plants etc.) are quite important group of providers, especially for retail networks and specialist shops. A disadvantage of this supply source is dispersion of the enterprises and related to this – distance and transportation cost.

This gap is partly filled by brokers that are quite important providers of specialist shops. Apart from transportation of products, they carry out a number

of operations such as accepting orders, creating clients database, collaboration with customers regarding volume and frequency of deliveries as well as gathering information on market demand. They take care of continuity of deliveries and quality of products. It is worth mentioning that they usually charge lower commissions comparing to wholesale margins (Czubała, 2003). Due to contact with a number of producers, brokers may contribute to improvement of the market product range, which in consequence may be a factor fostering organic market development.

As it was mentioned before, one of the most important obstacles of the efficient supply of retail outlets in organic food is dispersion of providers, which shifts the transportation costs. Motor transportation, that is cost-consuming but elastic, dominates. The conducted research proved that average distance from the specialist shop to wholesaler totalled nearly 146 km, and to general grocery shop almost 160 km.

Quite significant differences were observed in case of distance to processors, because it amounted to almost 170 km (specialist outlets) and 52 km (groceries). Groceries are provided by processors generally when they are placed in the neighbourhood. The same is in case of deliveries from farms – they were located 101 km away in case of specialist shops and 76 km away from grocery outlets.

Longer distance between specialist shops and suppliers, compared to groceries, generally result from the necessity to assure more diverse product range as well as the need to search for suppliers offering varied assortment. In case of retail networks, the situation is different, because the purchase is usually made for the entire network at wholesalers' distant between 20 and 70 km and processing plants placed up to 300 km

One of the obstacles hampering organic food market development may be also the fact that the retailers, especially specialist, apply high margin on organic food. It is justified to some extent, because they provide specialised service and therefore have higher operational costs. One should also remember that when applying margins, price elasticity of demand ought to be taken into account as well. If the margin and simultaneously the price are too high, the demand and revenues will be low. Most of the investigated specialist and general grocery shops apply margins in the interval of 21-40%, which means that they use high price strategy as they consider organic food as goods of higher order (Figure 5.) The specialist and grocery outlets also use innovative pricing strategy and price-quality strategy. It proves that retailers pay some attention to quality of the offered organic products and highlight advantages of their offer.

In turn, retail networks declared margin up to 20%, which is in line with their declared low price strategy for the entire assortment. Only the supermarkets offering delicatessen indicated high price strategy addressed to the purchasers with high incomes.

Figure 5 **Pricing strategies applied by the investigated retailers (%)**
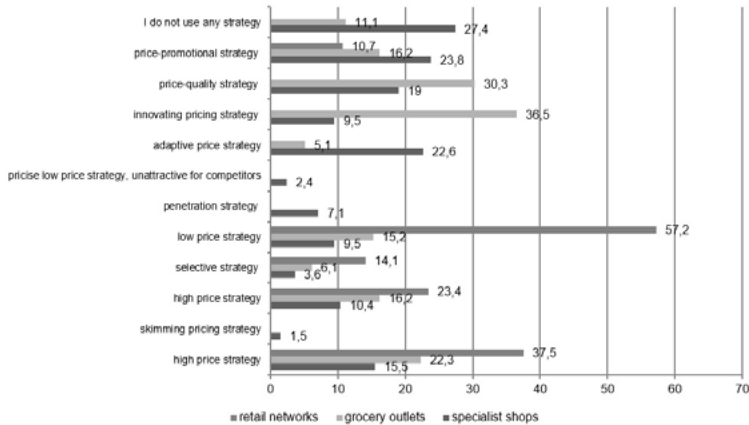
Source: Author's own research.

4   Conclusion

The organic market in Poland is still in the initial phase of growth. Despite some improvement that has been lately made, the structure and size of the market still deviates from the ones in Western European countries. The most significant

problems of the market are small supply volumes delivered to the market, low level of processing and dispersion of organic food market participants accompanied by lack of solutions assuring efficient organic product flow.

The conducted research proved that one of the main developmental obstacles occurring in retail of organic food are lacks in product range, which limits the accessibility of these goods. Part of the surveyed outlets, mainly belonging to the retail networks as well as groceries do not dispose such product range that would assure complexity of the offer. Nevertheless, it should be underlined that the investigated retailers are willing to widen their offer of organic food in future.

The lacks in the assortment mostly result from the narrow offer of the providers. The main suppliers of the specialist stores and groceries are wholesalers, farms (in fresh products) and brokers. However, the limitation of the sufficient distribution is dispersion of suppliers and the related to this distance between retailer and provider. This reflects in higher cost of delivery and simultaneously margins and price for organic food. In turn, high prices cause drop of demand quantity for most consumers. Only the segment of buyers with highest incomes, for whom the high price strategy may be applied, may afford to buy organic food. However, apart from the segment of high incomes, organic food should also be available for consumers with medium incomes, so that the development of organic farming and market of its products as well as the support for organic farms would be fully justified.

In the distribution sphere, collaboration and integration both vertical (between producers, intermediaries and retailers) and horizontal (e.g. producers groups or common purchase made by retailers) may be factors influencing development of the organic food market. This would also contribute to growth of efficiency of organic food distribution and simultaneously to decrease of its price level.

In addition, wholesalers should engage more in gaining market information or carrying out consumer studies. They also ought to participate more in promotion of organic food, particularly trough collaboration with retail chain and supporting actions towards popularization of organic food. That would help to increase the demand for organic food.

Acknowledgements

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AGRONOMIC EFFICIENCY AND ECONOMIC EFFECTIVENESS OF MINERAL NITROGEN FERTILIZERS IN WINTER

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Abstract

The paper deals with the assessment of agronomic and economic efficiency of winter wheat fertilization with mineral nitrogen fertilizers. The nitrogen dose for basic and regenerative fertilization was determined on the basis of soil analysis. Due to the higher N_{min} content in the soil than 60 kg.ha^{-1}, basic pre-seeding nitrogen fertilization in individual experimental years was omitted. Nitrogen and phosphorus dosages for production and qualitative fertilization were determined on the basis of the plant analysis, i.e. based on the total nitrogen and phosphorus content of the aboveground plant mass and the dry weight of 100 plants. Regenerative fertilization was carried out in the phase DC 25, liquid fertilizers were used for production fertilization in the phase DC 30 and qualitative fertilization (DC 59). Each fertilization treatment was repeated four times with a plot area of 10 m². The efficiency of winter wheat fertilization was assessed on the basis of the calculated coefficient of economic effectiveness (K_{EE}), the profitability of fertilization and the profit (Z) per hectare due to applied nutrition. The purchase price for winter wheat and for fertilizers valid for the given experimental year was used for the calculation.

Keywords: *optimization of fertilization, grain yield, coefficient of economic effectiveness, profit, growth phases*

1   Introduction

Nitrogen taken up by plant from soil significantly influences whole growth-productional process of winter wheat (Olšovská et al., 2014). Except carbon, nitrogen is the main element forming plant biomass and leaf area resulting to photosynthetic performance of crop and yield formation (Lawlor, 2002; Krček et al, 2008; Slamka et al., 2014). An amount of yield depends on total amount of nitrogen accepted by root system as well as on efficiency of its utilization for photosynthetic process and assimilates allocation into grains (Nátr and Lawlor, 2005; Hay and Porter, 2006). Under the surplus of nitrogen its total amount taken by plants increases, but efficiency of its utilization can decrease.

A relatively complicated pathway of nutrients from the surface of the leaf to its internal structures, together with a limited movement inside the plant and a relatively small dose of single-applied nutrients, limit the effective use of foliar fertilizers. Using only leaf fertilizers can not address long-term deficiencies in plant nutrition by macroelements. Therefore, foliar fertilizers are used in plant nutrition for supplementary or prophylactic fertilization (Hlušek and Lošák, 2006; Vaněk et al., 2006; Vaněk et al., 2013). Under no circumstances can they replace the plant's nutrition from the soil through the roots. It is possible for microelements as well as magnesium, but achieving optimal effect often requires repeated spraying.

The economic efficiency of nitrogen fertilizers is of particular interest from agricultural practice. The reason for this is the fact that the purchase and application of nitrogen fertilizers is associated with increased expenses. It is well known (especially for nitrogen) that the profitability of fertilization is not only influenced by the amount of harvest achieved, but also by its quality. At the same time, the effects of nitrogen fertilizers on the quality of production can significantly influence the resulting economic effect of their use. It is known that the highest crop quality is achieved at lower nitrogen doses and lower yields of the main product (negative correlation applies). In the search for economic efficiency, it is therefore important to decide whether it is preferable to fertilize for the maximum harvest or for the best quality.

Higher doses of nitrogen increase costs and the profitability of fertilization decreases. This is also confirmed by our results from field trials in Báhoň. When winter wheat was cultivated the highest profitability of fertilization was achieved at a dose of 80 kg.ha^{-1}N, with the application of 200 kg.ha^{-1} the yield was significantly lower (Hanáčková, 1995; Hanáčková and Slamka, 2011; Hanáčková, 2012). Finding the economic efficiency of soil fertilization with nitrogen is basically a search for optimal dose of nitrogen fertilizers. The optimal nitrogen dose is a dose that delivers the highest crop yields, quality, and profitability. Economic

cost and profit indicators must show that an increase in applied nitrogen dose brings such a yield increase that is profitable in terms of the costs incurred for its implementation (Bielek, 1998; Bielek, 2008).

The aim of the work was to assess the influence of various combinations of solid and liquid mineral fertilizers on wheat grain yield and the economic efficiency of fertilization in a three-year small-scale field experiment.

2   Data and methodology

The small plot field experiment with winter wheat, variety PETRANA, was established at the plant breeding station in Sládkovičovo - Nový Dvor between 2002/2003 and 2004/2005 in order to verify the agronomic efficiency and economic efficiency of applied nitrogen fertilizers. The experimental site is characterized by a long-term normal rainfall of 500 mm per year and an average annual temperature of 10.5 ° C. The pre-crop of wheat was peas. The trials were based on a block method on medium heavy loam degraded blackearth. The agrochemical properties of the soil prior to the start of the experiment are shown in Table 1.

Table 1 **Agrochemical analysis of soil before starting the experiment**

Year	Content of available nutrients (mg.kg^{-1})					pH$_{KCl}$	Humus (%)
	N$_{min}$	P	K	Mg	S		
2003	14,1	59	385	361	42	7,15	3,66
2004	13,5	55	365	352	39	6,96	3,55
2005	14,4	60	395	377	45	6,92	3,48

Source: Own processing, 2003-2005.

Nitrogen, phosphorus and sulfur doses and a summary of the fertilizers used in each of the fertilization variants are shown in Table 2 and Table 3.

The dose of nitrogen for basic and regenerative fertilization was determined on the basis of soil analysis (Michalík et al., 1986). Due to the higher N$_{min}$ content in the soil than 60 kg.ha^{-1}, basic pre-seeding nitrogen fertilization in individual years was omitted. Nitrogen and phosphorus dosages for production and qualitative fertilization were determined on the basis of the plant analyses, i.e. based on the total nitrogen and phosphorus content in the above-ground plant mass and the weight of dry matter in 100 plants (Michalík and Ložek, 1986).

Table 2 **Doses of nutrients (average of years 2003 - 2005)**

Treat.	Fertilizers	Doses of nutrients (kg.ha-1)						
		regener.	productional			qualitative		
		N	N	P	S	N	P	S
0	No fertilization	-	-	-	-	-	-	-
1	LAD	43,7	-	-	-	-	-	-
2	LAD + DAM	43,7	30	-	-	-	-	-
3	LAD + DAM	43,7	30	-	-	15	-	-
4	LAD + DAM + FOSTIM	43,7	30	10	-	-	-	-
5	LAD + DAM + FOSTIM	43,7	30	10	-	15	5	-
6	LAD + dusadam	43,7	30	-	4,6	-	-	-
7	LAD + dusadam	43,7	30	-	4,6	15	-	2,3
8	LAD + DAM + DUFOS	43,7	30	10	12,5	-	-	-
9	LAD + DAM + DUFOS	43,7	30	10	12,5	15	5	6,25

Source: Own processing, 2003-2005.

Table 3 **Applied fertilizers in respective fertilization treatments**

Variant	Applied fertilizers			
	Basic fertilization	Regeneration fertilization	Productional fertilization	Qualitative fertilization
0	-	-	-	-
1	-	LAD	-	-
2	-	LAD	DAM	-
3	-	LAD	DAM	DAM
4	-	LAD	DAM + FOSTIM	-
5	-	LAD	DAM + FOSTIM	DAM + FOSTIM
6	-	LAD	DUSADAM	-
7	-	LAD	DUSADAM	DUSADAM
8	-	LAD	DAM + DUFOS	-
9	-	LAD	DAM + DUFOS	DAM + DUFOS

Source: Own processing, 2003-2005.

Regeneration fertilization with fertilizer LAD 27 (27% N) was carried out in the phase of DC 25 and for production fertilization in the phase of DC 30 and qualitative fertilization after earing before flowering (DC 59) the following fertilizers were used: DAM 390 (30% N), FOSTIM 8-24-0 (8% N, 10.56% P), DUSADAM 26-0-0-4 (26% N, 4% S) and DUFOS 9-11-6 (9% N,4.84% P, 6% S). Each treatment was repeated four times with a plot area of 10 m². After harvesting with a small harvester, grain yield of wheat was determined by weighing. Grain yields for individual fertilization variants are listed in Table 4.

The efficiency of winter wheat fertilization was assessed on the basis of the calculated coefficient of economic effectiveness (K_{EE}), profitability of fertilization and profit (Z) per hectare (Fecenko and Ložek, 2000) (Table 5). In the calculation the purchase prices of winter wheat and fertilizers valid for the given experimental year were used (Ložek et al., 2007).

3   Results and discussion

From the point of view of weather conditions in the three-year experimental period 2002/2003 to 2004/2005, it can be briefly stated that two years were favorable and one unfavorable. This fact positively influenced the 3 - year average grain yields of wheat in this experimental period on different fertilization variants and thus also average of all fertilization variants when the grain yield of them achieved 6.72 t.ha^{-1} (Table 4). The statistical evaluation of winter wheat grain harvest over the three experimental years is shown in Table 4.

Table 4 **Grain yield of winter wheat (var. Petrana), average of 3 years**

Variant	Yield (t.ha^{-1})				Relatively %	
	years				0 = 100 %	2,4,6,8 = 100 %
	2003	2004	2005	average		
0	5,18	6,75	6,60	6,177	100,0	-
1	5,40	7,16	6,91	6,490	105,1	-
2	5,55	7,41	7,09	6,683	108,2	100,0
3	5,58	7,52	7,16	6,753	109,3	101,0
4	5,60	7,58	7,20	6,793	110,0	100,0
5	5,65	7,67	7,27	6,863	111,1	101,0
6	5,58	7,46	7,14	6,727	108,9	100,0
7	5,60	7,57	7,20	6,790	109,9	100,9
8	5,71	7,70	7,31	6,907	111,8	100,0

Variant	Yield (t.ha^{-1})				Relatively %	
	years				0 = 100 %	2,4,6,8 = 100 %
	2003	2004	2005	average		
9	5,73	7,83	7,38	6,980	113,0	101,1
Average	5,558	7,465	7,126	6,716	-	-
LSD $_{0,05}$ = 0,21$^+$ 0,17$^+$ 0,22$^+$ LSD years $_{0,05}$ = 0,05 $^+$ LSD treatments $_{0,05}$ = 0,13$^+$ $_{0,01}$ =0,24$^+$ 0,0,20^{++} 0,26^{++} $_{0,01}$ = 0,06^{++} $_{0,01}$ = 0,16^{++}						

Source: Own processing, 2003-2005.

LSD = least significant difference

The economic evaluation of the effect of applied nutrition on regenerative, production and qualitative fertilization of winter wheat is shown in Table 5.

These results show that on all fertilized variants (1 to 9), a statistically high increase in grain yield was achieved over non-fertilized control, with yield increments ranging from 0.313 t.ha^{-1} to 0.803 t.ha^{-1}, i.e. from 5.1% to 13%.

The lowest grain yield increase was achieved at the regeneration fertilizer with LAD-27 fertilizer at a rate of 43.7 kg N.ha^{-1} (var. 1), with an increase in grain yield of 0.313 t.ha^{-1}, i. e. by 5.1%. The profit per hectare was 11.69 €, fertilizer profitability was 34.4% and the coefficient of economic effectiveness (K_{EE}) was 1.34, that is 1 € spent on fertilizer purchase and its use brought a financial effect of 1.34 €.

The combination of nitrogen regeneration and production fertilization (var.2) 43.7 kg N.ha^{-1} for regeneration and 30 kg of N.ha^{-1} for production fertilization (in the form of DAM 390) increased the grain yield compared to the unfertilized control by 0.506 t.ha^{-1}, i.e. by 8.2%. The profit per hectare was 15.97 € and profitability represented 27.6%. The effect of production fertilization showed an increase in grain yield by 0.193 t.ha^{-1} compared to regeneration fertilization which generated an increase in profit of 4.28 € .ha^{-1}.

Table 5 **Economic evaluation of winter grain yield increment as a consequence of fertilization (average of 3 years)**

Variant	Increment of yield		Costs for fertilizers and their application (€.ha^{-1})	K_{EE}	Profit (€.ha^{-1})	Rentability of fertilization (%)
	t.ha^{-1}	€.ha^{-1}				
0	-	-	-	-	-	-
1	0,313	45,71	34,02	1,34	11,69	34,4
2	0,506	73,89	57,92	1,28	15,97	27,6

Variant	Increment of yield		Costs for fertilizers and their application (€.ha^{-1})	K$_{EE}$	Profit (€.ha^{-1})	Rentability of fertilization (%)
	t.ha^{-1}	€.ha^{-1}				
3	0,576	84,11	73,19	1,15	10,92	14,9
4	0,616	89,96	76,28	1,18	13,68	17,9
5	0,686	100,18	100,74	0,99	- 0,56	- 0,6
6	0,550	80,33	59,82	1,34	20,51	34,3
7	0,613	89,52	76,01	1,18	13,51	17,8
8	0,730	106,62	90,02	1,18	16,60	18,4
9	0,803	117,27	121,36	0,97	- 4,09	- 3,4

Source: Own processing, 2003-2005.

K$_{EE}$ = coefficient of economic effectiveness

The combination of nitrogen regeneration, production and qualitative fertilization at doses of 43.7 kg N.ha^{-1} + 30 kg N.ha^{-1} + 15 kg N.ha^{-1}, respectively (var.3) increased the grain yield of wheat compared to the non-fertilized control by 0.576 t.ha^{-1}, i.e. by 9.3%, with a profit of only 10.92 € ha^{-1} at 14.9% profitability of fertilization and K$_{EE}$ = 1.15.

The addition of 10 kg of P.ha^{-1} within production fertilization of wheat to nitrogen nutrition (var. 4) did not produce a statistically significant increase in grain yield compared to var. 2 (the increment was only 0.11 t.ha^{-1}). The profit per hectare at variant 4 has fallen from 15.97 € at variant 2 with only nitrogen nutrition to 13.68 €, so adding phosphorus to production fertilization was economically ineffective. An analogous situation occurred when phosphorus was also applied in qualitative fertilization at a dose of 5 kg P.ha^{-1} together with nitrogen nutrition (var. 5). The highest profitability of fertilization (34.3%) and profit (20.51 € .ha^{-1}) was obtained in variant 6, i.e., when N + S were applied together within production fertilization in the form of DUSADAM fertilizer. The yield increase was 0.550 t.ha^{-1}, K$_{EE}$ = 1.34.

A statistically significant yielding effect was obtained when phosphorus with sulphur were applied to nitrogen nutrition for production fertilization (var. 8) at doses of 10 kg of P.ha^{-1} and 12.5 kg of S.ha^{-1} and also by co-application of phosphorus (5 kg P.ha^{-1}) and sulfur (6.25 kg S.ha^{-1}) to nitrogen nutrition also for qualitative fertilization (var.9). In the case of production fertilization with phosphorus and sulfur added to nitrogen nutrition (var. 8), the grain yield compared to the nitrogen nutrition (var.2) increased by 0,224 t.ha^{-1}, but the profit per hectare increased only by 0.63 € from 15,97 € to 16,60 €.

For variant 9 where phosphorus was added to the nitrogen nutrition, and sulfur to both production and qualitative fertilization the crop yield increased compared to the applied nitrogen nutrition at variant 3 by 0.227 t.ha^{-1}, but the economic efficiency of this fertilization was negative, because it produced loss per hectare of 15.01 € ha^{-1} (compared to variant 3) and even with the nitrogen nutrition this variant (9) was economically ineffective (loss was -4.09 €.ha^{-1}), although it produced the highest grain yield increment of 0.803 t.ha^{-1} from all experimental variants compared with unfertilized control. This situation confirms the current reality that input prices (fertilizers, fuels) are growing much faster than the prices of output production, which stagnate or even decrease in some commodities.

4   Conclusion

On the basis of the three-year results obtained, the following conclusions can be drawn:

1. Grain yields of winter wheat and the qualitative parameters were affected by fertilization and weather conditions.
2. The highest increase in grain yield of winter wheat of 0.803 t.ha^{-1} was achieved by joint application of N, P and S in production and quality fertilization (variant 9: DAM + DUFOS), but the cost of fertilizers and their application were higher than the yield increment, resulting in a loss of 4.09 € .ha^{-1}. The inefficiency of fertilization was also confirmed by the K_{EE} value (K_{EE} = 0.97).
3. Despite the increase in grain yield by 0.686 t.ha^{-1} and achieved favorable qualitative parameters, i.e. content of crude protein =12,8% (class A) wet gluten = 30.0% (E), bulk density = 806 gl^{-1} (E), fertilization was unprofitable (-0.6%) for foliar application of fertilizers DAM + FOSTIM at production and qualitative fertilization (var. 5). The loss was - 0.56 €.ha^{-1}, K_{EE} = 0.99.
4. The highest profitability of fertilization (34.3%) and profit (20.51 € .ha^{-1}) was achieved in variant 6, i.e. when N + S were co-applied within production fertilization in the form of DUSADAM fertilizer. The grain yield increase was 0.550 t.ha^{-1}, K_{EE} = 1.34. At the same time, the quality parameters monitored corresponded to class A (content of crude protein = 12.7%, wet gluten = 29.2%) and to class E (bulk density = 805 g.l^{-1}).

Acknowledgments

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THE POTENTIAL OF AQUAPONICS AS FOOD PRODUCTION AND NUTRIENT RECOVERY SYSTEMS IN KENYA

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Abstract

Global challenges such as lack of arable land, soil degradation, water scarcity, nutrient depletion and climate change are compromising agricultural productivity. Besides, there is increased demand for innovative and sustainable food production systems to increase food productivity for rapidly growing population. Aquaponics is a new method of food production which uses aquaculture wastewater to produce crops, thus reducing the need for irrigation and provides nutrients for the growth of plants. This study examined the growth of sweet worm wood, pigweed and pumpkin and their ability as part of biological filters for intensive production of Nile tilapia. Physical and chemical parameters were monitored at the influent and effluent of the hydroponic system. The final wet weight of the plants was measured, and growth of fish monitored biweekly. The plants grew rapidly with no signs of nutrient deficiency during the experimental period. There was a significant variation in wet weight of the three plants (P 0.05). Sweet worm wood had the highest weight which corresponded to high nitrate uptake by the plant with 73.43% ± 3.92 nitrate extraction efficiency. However, there was no significant variation in the reduction of ammonia, nitrates and nitrites (P 0.05) in the three treatments. Phosphorus reduction varied among the three treatments (P 0.05) with pumpkin extracting more phosphorus. The highest extraction corresponded with fruiting stage of the plant. The study indicates that aquaponics can recover nutrients sufficient for the growth of plants.

1 Introduction

Agriculture in the 21ˢᵗ century is facing multiple challenges; to produce more food to meet the demand of a rapidly growing population with a small rural labour force and limited land and water resources (FAO, 2009). In addition, increasing demand of food may not be met by conventional farming systems because of decreased arable lands, soil erosion, depletion of soil nutrient and wavering costs of energy (Bindraban et al.2012). The increasing population and decreasing crop yields is similarly putting additional pressure on an already fragile food production system. In Kenya, productivity of main crops such as maize is declining due to infestation of army worms, land degradation, unpredictable weather events such as prolonged dry conditions and continuous splitting of land between inheritors (Henze & Ulrichs, 2015). Assuring food security in the 21ˢᵗ century requires new, innovative and sustainable food production systems that can increase crop yields using limited land and water resources with little impact on the environment and biodiversity (Pearson, 2007).

Aquaponic system is a relatively new concept to food production and can provide solutions to the challenges facing conventional farming systems in the 21ˢᵗ century. The system consists of an integration of recirculating aquaculture system with hydroponics (production of plants in nutrient rich solution) where water is efficiently recirculated for maximum nutrient uptake by plants (Tyson et al. 2011). It is considered an innovative and sustainable solution of food production (Tyson et al. 2011). The general design of the aquaponic system as reviewed by Rakocy et al. (2006) is a single recirculating aquaponics system which focuses on fish and plant production with a biofiltration unit to oxidize toxic ammonia to nitrates. The biofiltration unit is reduced or completely reset by a large hydroponic unit and can be located indoors or outdoors (Love et al. 2014). The fish excrete toxic ammonia which is oxidized by bacteria into much less toxic nitrate that is consumed by plants and the filtered water is then channelled back to the fish tanks (Rakocy et al. 2006). Fish wastes from aquaculture provide essential nutrients to plants and in return plants serve as a biofilter for fish in a symbiotic relationship (Diver, 2006). The system therefore, serves the purpose of reducing pollution and increasing productivity using less land and water resources (Dediu, 2012). The high initial investment can be recovered if the system is operated continuously near maximum production capacity (Rakocy et al. 2006). When the

aquaponic systems are used on subsistence scale, they can be a reliable method to provide a family of a cheap and nutritious food (Connolly and Trebic, 2010).

Aquaponics are one of the most efficient food producing systems since the amount of food produced per water volume is high. Studies have shown that 5 -10 times more output can be generated from the systems compared to conventional agriculture (Rakocy et al. 2006). Moreover, fish and vegetables can be produced without need for inorganic fertilizers, biocides or herbicides (Nelson, 2008). Food can also be secured for subsistence purposes (Pade and Nelson, 2007) in dry periods or desert zones (Al-hafedh et al. 2008), in regions with degraded soils and urban areas (Jorgensen et al. 2009). High yields in aquaponic systems is associated with higher planting densities, constant availability of water and lack of competition from weeds (Rakocy et al. 2006). Aquaponic trials in Alberta indicates that over 60 different crops can be grown in the aquaponic systems (Nelson, 2007) and almost all freshwater fish can be cultured in the systems except trout and salmon because they require high oxygen levels (Rakocy et al. 2006). There is potential for aquaponics systems to be profitable with high annual returns from plants and fish (Rakocy et al. 2006).

It is generally believed that aquaponic systems, with concomitant nutrients recovery, will become one of the widely accepted methods of sustainable food production in the future (Hu et al., 2012). Several studies in aquaponic systems have focused on improving the production of common herbs and vegetables in developed countries. However, there is little information regarding the production of plants in aquaponic systems developing countries particularly in semi-arid regions. This study compared the growth of sweet worm wood (*Artemisia annua*), pigweed (*Amaranthus dubius*) and pumpkin (*Cucurbita pepo*) in a small-scale recirculating system in a semi-arid area in Kenya. The production of fish and plants and nutrient extraction efficiency was determined.

2 Data and Methods

The experiment was conducted in a greenhouse to provide uniform conditions for the growth of both fish and plants in the aquaponic system. Three aquaponic systems were operated side by side for 3 months. Each aquaponic system consisted of 9 - 500L round plastic tanks filled with 400 L water and served as an aquaculture unit. Each tank was stocked with 5kg/m^3 of tilapia (*Oreochromis niloticus*). The fish were fed to satiation twice per day with 30% crude protein feed. The fish tanks were initially stocked with 450 *Oreochromis niloticus* with an average weight of 50g. The initial biomass in the recirculating aquaculture system was 22.5kg. An air pump (Aqua Forte, V-60) with a pressure of 0.03 Mpa and output 60 L/min

was used to provide sufficient oxygen in the culture tanks and biofiltration unit. Water from fish tanks flowed through gravity to sand filters which were built using a 200L plastic barrel filled with pumice stones. The sand filter served as a mechanical filter which captured majority of the suspended solids from aquaculture tank. A 0.5HP pump was used to channel water to the biological filter. From the biological filters, water flowed by gravity to the three aquaponic treatments. Then the treated water flowed back to the fish rearing unit. The grow beds consisted of three rectangular timber made units (1m x 0.5 x 0.8m) supported by timber. The schematic diagram of the system is shown in Figure 1.

After three weeks, the different plant species (*Artemisia*, *Amaranthus* and *Curcubita*) were transplanted from seed trays to the experimental grow beds at a stocking density of 36 plants per square metre. The plants were grown in three grow beds in three replicates. Fish sampling was done biweekly to determine the length and weight. The growth performance of fish was assessed using standard formulas. The yield of the plants was determined by obtaining the weight of the fresh leaves which was the total biomass less the weight of roots.

2.1   Water sampling

Water samples were collected biweekly to determine the nutrient extraction efficiencies of the three plants. The samples were taken from the influent and effluent of each grow bed. The samples were analysed for ammonium, nitrate, nitrite, phosphorus using benchtop Hanna multiparameter photometer (HI83200) according to Nessler, cadmium reduction, diazotization and ascorbic acid method respectively. Physical parameters such as temperature, pH, dissolved oxygen and conductivity were also monitored twice daily using handheld probes (HACH HQ40d Portable meter, USA). Nutrient extraction efficiency of plants was calculated using the following equation:

$$\textit{Extraction efficiency } (\%) = \frac{\textit{inlet} - \textit{outlet}}{\textit{inlet}} \times 100$$

Figure 1 **Schematic representation of the aquaponic system. A, B & C: Grow beds, - A1, A2, A3; *Cucurbita*, B1, B2, B3; *Artemisia*, C1, C2, C3; *Amaranthus*, FT1, FT2 & FT3: rearing tanks, SF: Sand filter, S: Sump, BF: Biofilter**
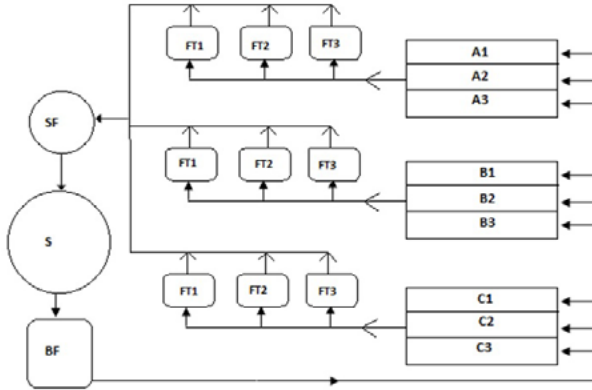
Source: Author's design.

2.2 Data analysis

Data were expressed as mean ± S.E, statistical differences between treatments were tested using one-way analysis of variance (ANOVA) followed by a Tukey's comparison test at $p < 0.05$. Statistical analysis was performed using the SPSS software package (IBM Corp., SPSS statistics, version 21, Armonk, NY, USA).

3 Results and discussion

3.1 Plant and fish growth

The survival of the three plants was 100% during the experimental period. No plant disease was observed during the study period, however, *Amaranthus* was infested with aphids which were eliminated by spraying fresh water on the affected plants. Significant differences in growth of the three plants were observed (P 0.05). The total wet weight at harvest was 450g, 506g and 630g for *Amaranthus*, *Cucurbita* and *Artemisia* respectively (Figure 2). The low weight in *Amaranthus* was linked to the aphid infestation which affected the growth of some plants. Whereas additional wet weight in *Artemisia* was linked to high uptake of nitrates (Figure 3) which translated to high biomass.

Figure 2 **Wet weight (g) of plants at the end of the experiment**
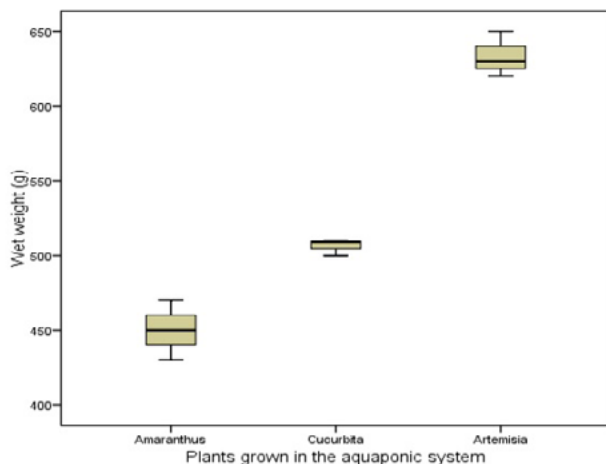
Source: Author's calculations.

The results for the growth performance of Nile tilapia is shown in Table 1. Fish in *Cucurbita* and *Artemisia* based aquaponics had similar mean weight and grew significantly better than fish in *Amaranthus* based aquaponics (P<0.05). There were no significant differences (P<0.05) in SGR, FCR and survival rate among the treatments. However, growth performance parameters were better in *Cucurbita* and *Artemisia* based aquaponics. Fish mortality was only observed during the initial period of the experiment when the fish had not acclimatized with the culture environment. The feed conversion ratios (FCR) were within the range of recirculating aquaculture system (1-3) (Eding et al. 2001).

Table 1 **Fish production performance in the aquaponic system Different superscripts ([a, b]) denote statistically significant differences between treatments (P < 0.05)**

Parameter	Treatment		
	Cucurbita	*Artemisia*	*Amaranthus*
Mean weight gain (%)	47.6 ± 7.02 [a]	47.3 ± 14.0 [a]	37.1 ± 7.47 [b]
SGR (% d^{-1})	0.98 ± 0.02 [a]	1.01 ± 0.07 [a]	0.94 ± 0.06 [a]
FCR	1.35 ± 0.06 [a]	1.38 ± 0.02 [a]	1.3 ± 0.02 [a]
Survival rate (%)	92.3 ± 3.55 [a]	93.0 ± 3.10 [a]	94.6 ± 2.05 [a]

Source: Author's calculations.

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3.2 Water quality in the aquaponic system

The mean values of physical-chemical parameters of water from the aquaponic system were within optimal range for growth of the three plants. Temperature, pH and conductivity did not vary significantly among the aquaponic treatments. However, there was a significant variation in dissolved oxygen (DO) levels among the three plants($P<0.05$). The concentration of DO in the three aquaponic treatments ranged between 1.24 mg/L – 4.03 mg/L in the morning and 1.54 mg/L – 4.61 mg/L in the evening. Water temperature was maintained at 20.5 °C – 30.3 °C. Temperature in the fish tanks was 24.7 ± 0.87 °C in the morning and 28.7 ± 0.07 °C in the evening. pH values ranged between 7.49 -8.43 (mean 7.74 ± 0.27) in the *Curcubita* grow beds, 7.41 – 8.02 (mean 7.72 ± 0.22) in *Artemisia* and 7.49 – 8.12 (mean 7.76 ± 0.26) in *Amaranthus*. Temperature, dissolved oxygen (DO), pH and ammonia play a major role in the aquaponic system since they influence the physical and chemical composition of water. Therefore, proper management of these parameters can improve the general health and growth of both plants and fish in the system (Goda et al. 2015).

3.3 Nutrient uptake by plants

The plants had the ability to reduce nutrients from aquaculture wastewater as shown in Figure 3, 4 and 5. However, there was no significant differences in the removal of nutrients among the plants (P 0.05). Ammonia reduction was high during the initial growth period of the plants (Figure 3). The reduction might have been influenced by the poor performance of the biofilter during the start of the experiment because nitrate concentration was low (3.6 mg/L) for the development of seedlings. Xu et al. (1992) demonstrated that ammonium was the preferred nitrogen source when nitrogen concentrations were low while nitrate was preferred when nitrogen concentrations were high. The low extraction of nutrients during the initial growth phase could also be linked to poor root network system in the seedlings. With the growth of plants and full development of root network, the absorption of nutrients increased resulting in a decrease in nutrients from the grow bed outlets.

Figure 3 **Changes in ammonium in the aquaponic system during the study period**
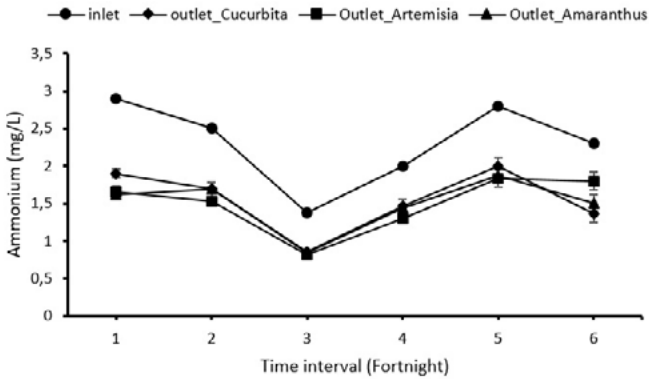
Source: Author's calculations.

The low nutrient absorption ability particularly nitrates during the initial growth phase and increase in plant uptake rate with growth of plants has also been reported in pak choi aquaponic (Hu et al. 2015). Studies have shown that higher plant biomass translates to higher plant uptake rate resulting in higher nitrate removal efficiency (Snow & Ghaly, 2008; Hu et al. 2015). In this study, nitrate reduction decreased at week 10 for all the plant species because they had attained harvestable biomass. The highest reduction in nitrate levels was observed in *Artemisia* where the concentration was reduced from 3.17 mg/L – 0.8 mg/L (Figure 4), although there was no significant variation among the plant species. Hu et al (2015) investigated the effect of plant species on nitrogen recovery in aquaponic and reported that nitrogen uptake by plants played an important role in preventing the accumulation of NO_3-N in aquaponic systems.

Figure 4 **Changes in nitrate concentration in the aquaponic system during the study period**
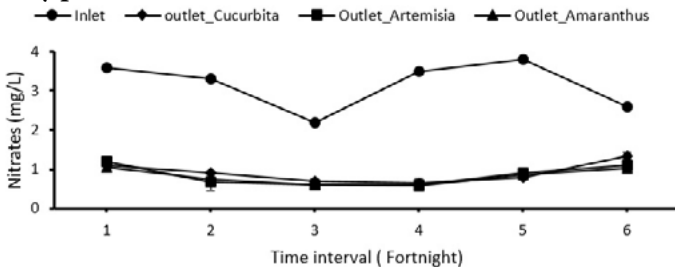
Source: Author's calculations.

Fish feed residues and fish waste are the major sources of phosphorus in aquaculture wastewater. In aquaculture waste water phosphorus occurs mainly as soluble and insoluble phosphates in organic and inorganic forms (Randall and Tsui, 2002). There was a general increase in influent phosphorus concentration with time. However, towards the end of the experiment the influent concentration of phosphorus reduced gradually (Figure 5). Extraction of phosphorus was consistent in all the treatments during the study period. *Cucurbita* was more effective in extracting phosphorus and the extraction increased with the growth period, at week 2 the plant absorbed 0.8 mg/L of phosphorus. At week 10 the plant extracted highest phosphorus (1.5 mg/L) from the influent water, the high extraction corresponded with the fruiting stage of *Cucurbita*.

Figure 5 **Changes in phosphorus concentration in the aquaponic system during the study period**
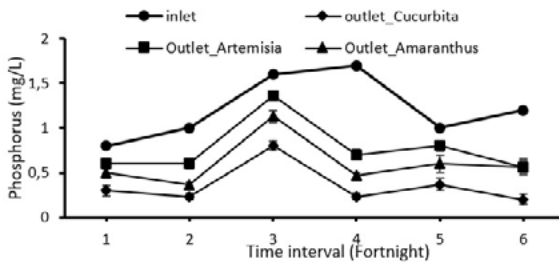
Source: Author's calculations.

Ammonia removal efficiency ranged between 33.44% – 36.45% (Table 2). Nitrate levels were reduced in the three aquaponic with time and were in the range of 69.84% – 70.43% at the end of the growth period. All the plant species were effective in removal of nitrates than ammonia. This was particularly true for *Cucurbita* which removed 70.06% of nitrates and 33.44% of ammonia. Phosphorus reduction was significantly high in *Cucurbita* with removal percentage of 70.35 % followed by *Artemisia* (49.22%). The reduction of 70.35 % is much higher than previous studies that reported 52.5% reduction (Lennard and Leonard, 2006) and lower than 87.1% to 95.1% reduction in barley hydroponic (Snow and Ghaly, 2008).

Table 2 **Nutrient removal efficiency by the three different plant species. The values are the average ofsix measurements.**

Nutrients (mg/L)		Treatment	
	Cucurbita	*Artemisia*	*Amaranthus*
Ammonium	33.44 ± 1.85 [a]	36.45 ± 2.67 [a]	35.29 ± 1.94 [a]
Nitrates	70.05 ± 4.86 [a]	73.43 ± 3.92 [a]	69.84 ± 4.55 [a]
Nitrites	38.28 ± 4.54 [a]	35.11 ± 4.00 [a]	39.76 ± 4.79 [a]
Phosphorus	70.35 ± 4.85 [b]	35.10 ± 6.31 [b]	49.22 ± 5.73 [b]

Source: Author's calculations.

The reduction of nutrients in the aquaponic system was linked to the utilization by plants and bacteria. In aquaponic systems, plants and bacteria play a significant role in water treatment. Plants uptake nutrient for plant growth from wastewater whereas nitrification bacteria that attach to the plant roots play a major role in nutrient cycle (Diver, 2006).

4   Conclusion

The study confirms that aquaponics can be reliable and sustainable food production systems in areas with limited land and water resources. Moreover, the system can recover nutrients from aquaculture wastewater sufficient for the growth of plants. The plants grew rapidly during the study period with no signs of nutrient deficiencies. No plant diseases were observed, although *Amaranthus* was infested by aphids which were eliminated by spraying freshwater on the affected plants. The extraction of nitrogenous compounds was not influenced by the type of plant. However, phosphorus extraction varied significantly among plants with *Cucurbita* extracting more followed by *Artemisia*. All plants were effective in removal of nitrates than ammonia. The extraction of nutrients was generally low during the initial growth period because the plants were still small with a poor root network system. As the plants grew and the network of roots developed, nutrient absorption increased. In general, the three plants had an extensive root network system which enabled them to absorb enough nutrients for growth. High biomass was observed in *Artemisia* due to high absorption of nitrates compared with other plants, although there was no significant difference in growth of the three plants. Based on the current findings, there is potential to improve food security through the production of both vegetables and herbal plants in aquaponic systems.

Acknowledgements

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SESSION 5

MANAGEMENT, ENTREPRENEURSHIP AND CORPORATE SOCIAL RESPONSIBILITY

EMPLOYMENT CHOICE OF NON-FAMILY PROFESSIONALS IN FAMILY FIRMS

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Abstract

Favouring to family members, fulfilling of family objectives, and convincing stakeholders to maintain family name have made family firms 'unprofessional in management practices' by which limit the attraction of professionally developed, skilful and trained non-family employees to employ in family firms. However, knowing unethical management practices take place in family firms, putting their career development at risk, non-family professionals also select family firms as their employer. Accordingly, this study addresses the research question, why professionals select family firms to employ? Identifying reasons behind the professionals' choice of employment in family firms serve as the goal of the study. Surveying of 145 non-family professionals employed in different capacities in family firms in Sri Lanka permitted the data analysis of the study. Stepwise logistic regressions with several other descriptive statistics facilitated to make the data analysis. The analysis discloses that the marital status of individuals and the degree of personal rewards from the firm have negatively affected to the choice of family firms by non-family professionals. Job position, work experience, family involvement and recognition of the firm by the society have positively influenced by non-family professionals to select family firms as their employer. Showing a wide spectrum of characteristics in different domains of employees, this analysis concludes that organizational characteristics are more important than socio-demographic and occupational characteristics in the case of non-family professionals' choice to work in family firms. The least important is reported as socio-demographic characteristics. However, amongst all, recognition

of the business by the society remains the first priority in non-family professionals' choice an employee's selection to work in a family firms, whilst of least importance is the degree of personal rewards from the business

Keywords: *Employee behaviour, family firms, choice of employment, non-family professionals, Sri Lanka.*

JEL classification: *M12, M51*

1 Introduction

All over evidences that support the mutual benefit between organizations and their employees of family firms, a study by Bassanini, et al. (2013) observed that an employee's package of family business is lower when compared to non-family businesses. Further, family businesses are labelled as traditional in technology, conventional in business focus, less energetic in development and less exciting in change (Astrachan Binz, 2014; Allio, 2004; Poza, Alfred & Maheshwari, 1997). The high potential for conflict in decision making and favouring family members has become a common characteristic which is a result of the family involvement in family businesses (Ensley & Pearson, 2005). With all these issues, family firms still with the possibility to attract skilful, trained professionals from the labour market while professionals also show their willingness employ in family firms taking the risk of their career development. A simple question to ask after looking at above information is; why does a potential non-family professional select to employ in a family firm? This question becomes fair enough to inquire as previous literature confirms that individual occupational decisions are taken based on employment status (wages, job security) and public image of the employer (Van Willigen, 2000). Limited studies have provided empirical findings about occupational selection of professional employees like engineers, lawyers, accountant, designers and technicians. Specifically, very few have addressed the same concept in the context of family firms. However, an incomplete supply of needs by parties as explained by person-organisation fit theory and mixed results of characteristics of employees to connect to a better person-organisation by previous studies have set the goal of this study. This study intends to identify probable determinants and their relationships of individual professionals' characteristics when employed in family firms.

1.1 Literature review

The congruence of values between an employee and his or her organisation is emphasized by P-O fit theory (Velez & Moradi, 2012). The theory simply views that what a person contributes to an organisation such as skills, knowledge and competencies, the organisation also gives back benefits such as values, competencies, and perspectives. However, the congruence of values between organisations and employees motivates employees to adjust their skills, abilities and competencies to the requirement of employers (Jex & Britt, 2008). If this relationship is uninterrupted by other matters, employers can consider this fit as the driving force behind attracting employees and keeping them in the organisation longer periods rather than salaries or promotion. Further, P-O fit theory has been immensely used by scholars in recognising employees' preference to organisations (Block *et al.,* 2016).

The literature pertaining to family firms contains several studies of individual preferences to working in family firms. When analysing the general view of public about the brand image of family firms, Krappe, Goutas, and Von Schlippe (2011) concluded that family firms are believed to be socially attractive and sustainable but inflexible when it comes to change. Another study by Astrachan Binz (2014) explored the perceptions of individuals in family firms, the findings suggested that people perceived family firms as traditional in performance, inefficient in development but trustworthy in the case of employees' job security and welfare. Astrachan Binz, Hair, Pieper *et al.* (2013) have shown that a family firms' 'image' can positively influence that businesses performance, this is primarily because it attracts customers thus increases sales. Similar results are obtained by Zellweger, Kellermann, Eddleston, and Memili (2012) and Craig, Dibrell, and Davis (2008), all of whom attribute the performance enhancing effect of family firm's 'image' to the fact that a family-based brand identity enhances the businesses ability to attract customers. Finally, Orth and Green (2009) found that consumers evaluate family firms (grocery stores) more positively in terms of service, trust, and benevolence, but more negatively in terms of the price or value.

2 Data and Methods

In order to test the conceptual model, a survey of employees working in privately held family businesses in Sri Lanka (Colombo, Gampaha and Kaluthara in Western Province) was conducted in 2016. Ultimately, an author and enumerators could manage to visit and collect data from 17 family firms, of which 12 businesses were mostly oriented in manufacturing with the rest in both manufacturing and services. Samples of 152 non-family professionals who employ as engineers,

lawyers, technicians, designers, accountants, ICT officers and book keepers were using a convenient sampling technique. A structured questionnaire was used as the primary data collection tool. All measurements - validated by previous research contained the questionnaire. The variables of the study are given in Table 1.

Table 1 **Variables and Their Scale of Measurement**

Dependent variable	Scale of dependent variable
preference to employ in family firms	dichotomous variable; =1 if having a chance to employ in another firm with similar benefits, still select current firm or another family firm =0 otherwise
Independent variables	Scales of independent variable
Socio-demographic characteristics	
Gender	dichotomous variable; 1= male, 0 = female
Age Marital status Size of the family	scale variable; age of the respondent(years) dichotomous variable; 1 = married, 0 = otherwise scale variable number of family members in the respective family
Education	dummy variable; 1 = tertiary, 0 = otherwise
Income from the job	dichotomous variable; 1 = can manage basic needs of a month, 0 = otherwise
Occupational characteristics	Independent variable
Job status Labour market experience Job orientation Carrier development	dichotomous variable; 1 = managerial, 0 = otherwise dichotomous variable; 1 = more than 10 years, 0 = less than 10 years dummy variable; 1 = skilled and professional , 0 = otherwise dummy variable; 1 = happy, 0 = otherwise
Organisational characteristics	Independent variable
Degree of **p**ersonal rewards from the organisation	dummy variable; 1 = happy, 0 = otherwise

Dependent variable	Scale of dependent variable
Influence of family members	dummy variable; 1 = appropriate, 0 =otherwise
Recognition of the firm by the society	dummy variable; 1 = happy, 0 = otherwise
Development of the firm during last five years	dichotomous variable; 1 = happy, 0= otherwise

Source: Developed by Authors based on available literature.

Data collected from the field was analysed deploying quantitative techniques. Descriptive statistics and logistic regression provided the statistical rigor supported by SPSS software. Stepwise logistics regression was initially used when dependent variable appears as binary and later the model was recognised effective when both categorical & continuous variables represent the model as predictor variables (Reed Wu, 2013). The logistic model of this study contains 14 predictor variables of which two variables are scale and all others are dichotomous variables. The coding of outcome of logistic model is interpreted Y=0 or Y=1 indicating the present or absent of an incident. When 'pr' denotes the probability of presentation of an incident, following notions shows the technicality of development of the model.

$$Logit(\text{Pr}) = \log \frac{Pr}{1 - Pr} \quad (1)$$

$$Pr = E\left(Y = \frac{1}{X}\right) = \frac{1}{1 + e - \left(\alpha_0 + \sum_i^n \alpha_i X_i\right)} \quad (2)$$

$$\text{Pr}(event) = \frac{e^{\left(\alpha_0 + \sum_i^n \alpha_i X_i\right)}}{1 + e^{\left(\alpha_0 + \sum_i^n \alpha_i X_i\right)}} \quad (3)$$

Further, expected probability of outcome is represented by 'Pr', coefficients are represented by $_n$ Independent variables are given by x_t. The outcome is the estimated ln of the odds that the outcome is undertaken in Eq. 4.

$$\left(ln\left(\frac{Pr}{1 - Pr}\right)\right) = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_i + \dots + \alpha_n X_n \quad (4)$$

Finally, a dichotomous variable of the outcome variable of employee's preferences to work in family firms was regressed over 14 predictors of dichotomous and dummy variables.

3   Results and Discussion

The data analysis process began with descriptive statistical analysis of responses obtained by the sample of 145 respondents to identify probable determinants and their relationships of individual characteristics to select an occupation in family firms. The sample contained 86 of male and around 50 non-family professionals as unmarried respondents. 80 percent of non-family professionals in the sample had studied up to tertiary level in education. However, where overall answers are concerned, 91 out of 145 respondents reported that they like to work in family firms rather than non-family firms. The average age of non-family professionals is indicated as 31 years. The average size of the family, regardless of marital status of non-family professionals in the sample is counted as four members.

According to the stepwise logistic regression which highlights the socio-demographic, occupational and organizational characteristics of non-family professionals respectively comprise Model 1, Model 2 and Model 3 against non-family professionals to work in family firms. However, the analysis focuses to identify determinants of the individual choices of non-family professionals to be employed by family firms based on the results of Model 4 which finally included all variable together.

Table 2 **Logistic Regression Results for Employee's Preference to Work in Family Firms**

Characteristics	Model 1			Model 2		
	β	(t-stat)	Sig.	β	(t-stat)	Sig.
Socio-demographic characteristics						
Gender of the employee	-.157	.146	n.s.			
Age of the employee	.000	.000	n.s.			
Marital status of the employee	-.303	.384	n.s.			
Size of the family of the employee	.396	2.69	n.s.			
Education of the employee	1.69	15.6	*			
Income from the job of the employee	.454	1.21	n.s.			
Occupational characteristics						
Job status				1.43	7.07	*
Labor market experiences				2.19	7.66	*
Job orientation				1.12	4.48	*

Characteristics	Model 1			Model 2		
	β	(t-stat)	Sig.	β	(t-stat)	Sig.
Career development				.15	.090	n.s.
Organizational characteristics						
Degree to personal rewards from the organization						
Influence of family members						
Recognition of the firm by the society						
Development of the firm during the last five years						
Chi- square value	49.10***			28.6*		
Nagelkerke pseudo R_2	.244			.426		
Cox & Snell R_2	.179			.312		
Classification accuracy	72.4			75.2		

Characteristics	Model 3			Model 4		
	β	(t-stat)	Sig.	β	(t-stat)	Sig.
Socio-demographic characteristics						
Gender of the employee				-.220	.052	.n.s.
Age of the employee				-.108	1.27	n.s.
Marital status of the employee				-3.26	3.89	*
Size of the family of the employee				.998	2.83	. n.s.
Education of the employee				2.29	3.54	n.s.
Income from the job of the employee				-.373	.142	n.s.
Occupational characteristics						
Job status				6.2	9.72	*
Labor market experiences				3.8	4.54	*
Job orientation				.83	.77	n.s.
Career development				-.72	.49	n.s.
Organizational characteristics						
Degree to personal rewards from the organization	-5.2	6.28	*	-5.2	6.28	*

Characteristics	Model 3			Model 4		
	β	(*t*-stat)	Sig.	β	(*t*-stat)	Sig.
Influence of family members	4.3	9.44	*	4.3	9.44	*
Recognition of the firm by the society	6.5	19.7	n.s.	6.5	19.7	*
Development of the firm during the last five years	-1.8	2.43	n.s.	-1.8	2.43	n.s.
Chi- square value	54.2*			144*		
Nagelkerke pseudo R$_2$	.861			.861		
Cox & Snell R$_2$	.631			.631		
Classification accuracy	94.5			94.5		

N.B: *significant at α = 0.05
Source: Developed by authors based on primary data.

According to the Model 4 of Table 04, when socio-demographic character-istics of employees are concerned, only the marital status of employees has pro-vided significant negative results. The other strong influence can be observed in occupational characteristics. Two characteristics, namely job status and labour market experience have positively influenced an employee's preference to work in family businesses. Majority of organizational characteristics has shown sig-nificant effect to the non-family professionals' choice to be employed by family businesses. However, the degree of personal rewards from the family firm has re-ported a negative effect in employment of non-member professionals. The minus odds ratio of degree to personal rewards from the organization (-5.2) indicates that the odds for the preference to working in a family firms increases by 52 % if the respondent is not happy about the personal rewarding system. This finding could be practically controversial. Yet, the results indicate that the personal re-ward is not a main aspect of non-family professionals when selecting family firms. All other organisational characteristics like family involvement and recognition of the firm by the society have shown positive significant influence to non-family professional's choice to employ in family firms.

Showing a wide spectrum of characteristics in different domains of employ-ees, this analysis concludes that organizational characteristics are more important than socio-demographic and occupational characteristics in the case of non-fam-ily professionals' choice to work in family firms. The least important is report-ed as socio-demographic characteristics. However amongst all, recognition of the business by the society remains the first priority in non-family professionals'

choice an employee's selection to work in a family firms, whilst of least importance is the degree of personal rewards from the business.

4   Conclusion

The scholarly debate surrounding the drawbacks of family firms such as nepotism, unprofessionalism and stagnation in development has made the choice of a potential non-family employee to work in a family firms critical and requiring investigation but the career path of such employees are uncertain. Accordingly, this study focused to identify and examine the factors behind organizational choice of non-family professionals working in family firms in Sri Lanka. As a result, organisational characteristics were identified as the most important factor whilst socio-demographic characteristics were recognised as least important factor of preference of non-family professionals when working in family firms. Amongst all, recognition of the business by the society at large remains the first priority in the non-family professionals' selection to work in a family firm while the least important is the degree of personal rewards from the firm. Thus, this study has brought a clearer and complete view of the professionals' perception of being employed by a family firm and the contribution for theory, practice.

Acknowledgements

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COMPARISON OF METHODS OF EVALUATION THE CORPORATE SOCIAL RESPONSIBILITY

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Abstract

The concept of CSR and comparison methods of evaluation CSR has gained increasing attention from plentiful businesses,business-analysis authors, non-governmental organizations (NGOs) and other bodies. Various concepts of CSR have been evolved in order to classify the character of business in relation to society. CSR is a steadily changing concept which means different things to different sectors and countries.

Based on a world standards of corporate social responsibility (CSR), an article compare the methods of evaluation of the corporate social responsibility in international level and also to compare two guidelines of CSR. The four CSR standards are UN Global Compact, ISO 26000 Guidance on Social Responsibility, Dow Jones Sustainability Index,SA8000. The method of analysis consist of many factors that reflect the importance of each standard. In total, 98 countries out of 133 countries made accessible by the World Economic Forum, apply at least one CSR standard. The findings show a significant difference in CSR standards among the states, which point out the various perceptions of the companies or needs of each country.

The evaluation of methods of corporate social responsibility (CSR) becomes the problem. The question is which approach is appropriate, because its choice may depend from the findings "whom and to what purpose the evaluation serves", from the object and subject of the evaluation, as well as from the awareness of current trends in the evaluation. The aim of this article is to compare appropriate methods of evaluation of the CSR. The CSR concept is closely connected with ethical, environmental and social development, sustainable improvement, management, philanthropy and different forms of altruism. De facto, CSR offers a set of principles and values on which is possible to construct a more cohesive society and to set up the changeover to a sustainable economic system.

Keywords: *corporate social responsibility, methods of evaluation, sustainability*

JEL classification: *M14, L33, L22*

1   Introduction

The evaluation of corporate social responsibility (CSR) becomes the issue. The practice determines that presently there are methods, standards and actions that grant evaluating this fact. The question is which path is the right one, because its choice can depend from the findings whom and to what logic the evaluation provides, from the object and subject of the evaluation, as well as from the perception of ongoing trends in the evaluation. The aim of this paper, based on an analysis, is to identify acceptable approach to evaluating the CSR of the organization. The CSR concept is closely associated with environmental, ethical and social analysis, sustainable improvement, management, philanthropy and different forms of donation. In fact, CSR offers a set of assumptions and values on which is possible to build a more united society and to authorize the transition to a sustainable economic system.

Keith Davis and Robert Blomstrom in their book Business and its Environment characterized social responsibility as (Davis, Blomstrom, 1966) "a person's obligation to consider the effects of his decisions and actions on the whole social system". The improvement came at the end of the sixties and seventies of the 20th century, when with the influence of bitter social change in western society were established definitions, they were less emphasized on the temperament of manager and more concetrated on the interaction between company and socio-economic system. The comfirmation is the definition from 1973, which is based on the concept of good neighbourliness Eilbert, Parket, 1973: "Perhaps the best way to understand social responsibility is to think of it as good neighbourliness". The idea involves two aspects. On one hand, it means not doing things that harm the neighbourhood. On the other, it may be expressed as the independent assumption of the obligation to deal with solving the neighbourhood problems.

Corporate social responsibility comes in many various aspects and sizes (Carroll, 1979; Buciova, 2008; Dahlsrud, 2008; Kuldova, 2010; Remisova, 2011; Lorinczy, Sroka, Jankal, Hittmar, Szanto, 2015), but it commonly be categorized into three fields (Elkington, 1994): the first is economic; the second is social and the third is environmental.

Alexander Dahlsrud (Dahlsrud, 2008) in his work "How Corporate Social Responsibility is defined: an Analysis of 37 definitions" identified five main fields of

CSR: economic, environmental, social, stakeholders and voluntariness. He found that four of these five areas occur in 80% of the interpretation and at least three of the five fields are in 97% of the definitions.

Presently the evaluation of individual elements of corporate social responsibility has been lately becoming the problem in spite of the fact (Jankalova, 2013), that there are presently methods, standards and initiatives which empower to measure this status (Dow Jones Sustainability Index, FTSE4Good Index, Business Excellence models, DAXglobal Sarasin Sustainability Germany Index EUR, Ethibel Index, Global Challenges Index, MSCI World ESG Index, Global Challenges Index, UN Global Compact principles, STOXX Global ESG Leaders, STOXX Sustainability Indices, Dax Global Alternative Energy Index, Stoxx Europe Christian Index, Hang Seng Corporate Sustainability Index, , Global Sullivan Principles, OECD guidelines for multinational companies, Ethical Trading Initiative Base Code ...). The problem is not the absence of these approaches, but the fact that not every approach can measure the state of CSR in each field, i.e. in economic, environmental, social, stakeholder etc.

In general the guidelines are voluntary and can be used as inspiration. Consequently, they are not subject to regulatory application. In many countries, several of the subjects of the guidelines are issue to legislation. In this situation, it is essential to be aware that the guidelines cannot replace or abrogate applicable national laws and regulations. In the following, there is a short introduction to each of the two international guidelines for CSR and also two world known standard and index whose are very important for evaluation of CSR

The aim of this article, based on an analysis, is to identify convenient approach to evaluate the CSR methods, standards and initiatives. Because of the many accesses to the evaluation of corporate social responsibility, this article analysis only the selected approach as sustainability indexes and guidelines. The paper is constructed as follows: section 2 describes the methodology approach; section 3 defines the theoretical background on structure, determination and application of sustainability indexes and the guidelines; section 4 reports the findings about secondary data on system, determination and application of sustainability indexes and guidelines; section 5 is the conclusion and reviews the methods of evaluation of the CSR activities of the organization and comparison of this methods.

Un Global Compact

The UN Global Compact is a global policy initiative for businesses, including ten general principles for corporate work with social responsibility. The principles frame on internationally recognized conventions within four areas: labour, human rights, the environment and anti-corruption. An enterprise or organization

can use the ten principles as inspiration, and can in extension, choose to join the UN Global Compact regularly. However, only enterprises with more than ten employees can be properly accepted into the UN Global Compact's' database. By joining, an enterprise execute to making the ten principles a part of its business activities and to note annually about the progress to the UN Global Compact.

ISO 26000 Guidance on Social Responsibility

ISO 26000 Guidance on Social Responsibility is an initiative of the International Organization for Standardization (ISO). Among other things, ISO 26000 consists of definitions, background, principles and seven essential subjects on social responsibility. The seven essential subjects are; organizational governance, labour practices, human rights, the environment, fair operating practices, consumer issues and community involvement and development. The main subjects have 37 related matters. ISO 26000 contributes guidance on how a socially responsible enterprise or organization can and should work with implementation, stakeholder involvement, due alertness and communication on its CSR achievement. ISO 26000 can be used as inspiration, but if it should be able to claim an enterprise socially responsible according to the Guidance, actual efforts must be formed within all seven core subjects. Certification to ISO 26000 is impossible. The requirements and contents of the individual elements of this standard are based on ISO 26000. Enterprises that already have one or more management systems (e.g. quality and environmental) can integrate these in a management system according to the standards of their country regulations.

Dow Jones Sustainability Index

Since the launch of the globally renowned Dow Jones Sustainability Index (DJSI) series in 1999, RobecoSAM has been driving innovation in the fields of ESG investing. Constructed on the strength of our accurate internal analytics and research, they have been founders in the development, construction and application of indices specifically for use by the asset management industry and more widely in driving the ESG movement worldwide.

They have developed some of the most sophisticated ESG index solutions accessible to the asset management industry through our unique and rare methodology for gathering, analysing, quantifying, and distributing ESG data. Each year they ask over 3,900 listed organizations around the world between 80-120 industry-specific questions focusing on economic, environmental and social factors that are important to the organization's success, but that are under-researched in regular financial analysis. This data, connected with sustainability and risk/return objectives of investors, is used to produce our family of indices, including our global indices, sub-indices, and innovative products like the multi-factor smart-beta

ESG indices. Their ESG equity indices are based on RobecoSAM's proprietary ESG database, covering over 600 ESG indicators for over 4,000 global companies.

SA8000 Standard

The SA8000 Standard is the leading social certification standard for factories and organizations across the globe. It was established by Social Accountability International in 1997 as a multi-stakeholder initiative. Over the years, the Standard has evolved into an overall structure that helps certified organizations determine their commitment to the fair treatment of workers across industries and in any country. SA8000 measures social performance in eight areas significant to social accountability in workplaces, attached by a management system element that drives constant improvement in all areas of the Standard. It is welcomed by brands and industry leaders for its accurate approach to ensuring the highest quality of social conformity in their supply chains, all the while without giving up the business interests.

2   Methodology approach

The aim of this article, based on an analysis, is to identify relevant approach to evaluate the CSR of the organization. The achievement of the aim was preceded by:

- CSR definition and identification of CSR elements,
- analysis of sustainability indexes in point of perspective of selected studies,
- analysis of two chosen guidelines for CSR
- analysis of approaches to evaluate the CSR in point of own research and experience.

3   Theoretical background

Currently existing autonomous agencies (Dow Jones from Switzerland, Ethibel from Belgium, FTSE from UK, Business in the Community from UK, James Ethics Centre from Australia, ECPI from Belgium, EIRIS from UK, OEKOM Research AG from Germany), which ones deal with the valuation of corporate social responsibility. Their improvement is in the creation of own indexes with which they measure the performance of organizations that behave responsibly towards society. A choice in which organizations may be included in these indexes depends on the achievement of the criteria of "socially responsible behaviour" that is setting independently by the agencies. Between the significant international indexes belong Dow Jones Sustainability Index, Global Challenges Index,

FTSE4Good Index, Ethibel Index and MSCI World ESG Index. In last years, increased an importance of indexes applied only at local level. An example are DAXglobal Sarasin Sustainability Germany Index EUR, STOXX Global ESG Leaders Global Challenges Index, STOXX Sustainability Indices, Dax Global Alternative Energy Index, Stoxx Europe Christian Index and Hang Seng Corporate Sustainability Index. A lot of authors have involved with the research of individual indexes structure and their function. Studies on sustainable indexes can be divided into three sections:

- those which analyse and explore the framework of sustainability indexes (Sjostrom, 2004; Mitchel et al., 2004; Hamner, 2005; Kasparova, 2006; …),
- those which explore the function of sustainable indexes (Sjostrom, 2004; Beurden, Gossling, 2008; Cerin, Dobers, 2008; …) and
- those which explore other aspect, such as their application by the evaluation of Corporate Social Responsibility activities of organization (Avlonas, 2004; Jankalova, 2013; …).

A combination of the first two accesses is research of Sjostrom (2004), in which he classified thirteen organizations providing sustainability indexes for European, American, Asian, and Global markets. It was demonstrated that (Sjostrom, 2004) all indexes also do an evaluation of the financial power of the organization, because there wouldn't be a lot of a points of these indexes if there was a financial replacement. None of investors would sacrifice financial reward even if it was for a good reason, because their one and only aim is to maximize the return on the invested money. The various providers draw the index elements from different investment universes: Some use traditional indexes, such as Standard & Poor's Global index or Dow Jones World Index. Most sustainable indexes are market capitalization weighted, which means that every stock's weight in the index is equitable to that stock's total market value. A lot of indexes have a fixed number of constituents, so if one organization is excluded it is directly replaced with another. The amount of constituents in the described indexes varies from 45 to 2,343. The indexes are basically reviewed every three or four months to assure that the index composition exactly represents leading sustainability organizations, and some are also checked daily for environmental, economic and social crisis situations that can lead to discharge from the index. The dominant underlying function behind the sustainability indexes is to measure the performance of organizations that meet particular sustainability criteria, and to manage investors with an SRI benchmark (Sustainable Responsibility Investment). With the other words, they want to simplify socially and environmentally responsible investments. Some index providers have a more extensive function, in this they also want to increase

consciousness about CSR and SRI and encourage socially and environmentally responsible performance, and one could assume that they are not only profit-driven but also values driven in their accomplishment.

Hamner (2005) investigated and analysed the structure of 12 indexes (Dow Jones Sustainability Index, Ethibel Global Index, Ethical Global Index, FTSE-4GOOD Global 100 Index, Humanix 200 Global, ASPI Eurozone Index, Ethinvest Environmental Index Australia, Jantzi Social Index Canada, Johannesburg Stock Exchange / FTSE 4Good Index South Africa, Humanix 50 Index Sweden, Calvert CALVIN Social Index USA, KLD Domini 400 Index USA) with the goal to find the main sustainability criteria used by the 12 indexes and to count the criteria by conceptual associations. The conclusion are in Table 1 and it shows the most popular criteria used by the analysed indexes.

Table 1 **Frequency analysis of criteria in indexes of sustainable corporations**

Frequency	Sustainability criteria	Frequency	Sustainability criteria
9x = 75%	Health and safety	4x = 33%	Communication Discrimination Legal compliance
8x = 67%	Corporate governance CSR performance reporting Labor and union relations Pollution prevention	3x = 25 %	Contracts Codes of ethics Animal relations Risk management Environmental performance Relations to customers and suppliers Energy sources
6x = 50%	Training and education Quality Compensation Diversity	2x = 17%	Leadership and incentives Management Non-executive director remuneration Conduct of business Sustainability assessment Rights Management Profit sharing Family support Product safety Recycling Environmental management system
5x = 42%	Innovation Benefits Human rights		

Source: Hamner, 2005.

That one research provides (Hamner, 2005), that the most important consideration is the powerful focus on internal employee relations for sustainability, such as health and safety, labor relations and pollution avoidance. Hamner's point of view, investors know that good achievement is created by a good business culture and sustainability programs should focus on internal improvement first and external development second. It was also noted that three of the major criteria are

often integrated: education and training leads to prevention of pollution which increase health and safety. Hamner's research proved earlier completed Mitchel's research (Mitchel et al., 2004), who analysed indexes DJSI, Ethibel, FTSE4Good, Domini400 and Calvert. By the comparison of monitoring fields, he found out the conclusion that the checked field of the individual indexes differed obviously. On the disparity of indexes also pointed Kasparova (2006). Her research was based on expanded research of Hamner (2005). The other researches are dealing with the application of the sustainability indexes by the evaluation of Corporate Social Responsibility activities of organizations (Avlonas, 2004; Jankalova, 2013). It is mostly this research area that indexes are the tools of coverage, self-assessment and assessment of CSR activities of companies (Table 2).

Table 2 **Research on CSR models, standards, guidelines and indexes**

CSR approach	Tool for reporting	Tool for self-assessment	Tool for assessment
The EFQM Excellence Model	++	+++	+++
Social Accountability - SA 8000	+	+	+++
ISO 14OOO		++	+++
EMAS	+	++	+++
AccountAbility 1000 (AA1000)	++	+	+++
Global Reporting Initiative (GRI)	+++	++	
Value Management System (VMS)		++	++
Dow Jones Sustainability Index	+	++	
FTSE4good		++	

Source: Comparison by Avlonas, 2014.

A comparison of the most essential contents

The purpose of the two international guidelines is to establish a simple international basis for responsible business policy. The guidelines are integral to each other. They involve a lot of issues and sub-issues, and the phrasing and use of particular words and terms varies considerably. If an enterprise wants to apply the guidelines in work place, it is appropriate to examine the literal wording of the relevant paragraphs.

A term appearing in all the two guidelines is due alertness. Mostly it composes a structured process through which circumstances of the enterprise within one or more fields are analysed to classify risks, costs and profits. For the function of the two international guidelines for CSR, due alertness is a method for the organizations to address possible CSR objections. The method includes recognition of certain and possible adverse social, environmental and economic impacts,

prevention and alleviation of such impacts, how the enterprise enable access to cure, and finally how the enterprise will communicate about this process.

By comparing the contents of the two guidelines, it can be divided into the following four topics:

- Human rights,
- Labour,
- Environment,
- Economic and business issues.

Overview of the contents of the guidelines

Human rights

ISO 26000	UNGC
Protection and respect	Protection and respect
Political involvement	Political involvement
Policy	Policy
Due diligence	Due diligence
Remedy	Remedy
Human rights risk situations	
Resolving grievances	
Discrimination of vulnerable groups	

Labour

ISO 26000	UNGC
Employment relationships	Employment relationships
Workers' rights, including the right to join trade unions and to collective bargaining	Workers' rights, including the right to join labour unions and to collective bargaining
Working conditions and social protection	Forced labour
Forced labour	Child labour
Child labour	Discrimination in employment and occupation
Discrimination in employment and occupation	
Cap on weekly working hours	
Health and safety at work	

Environment

ISO 26000	UNGC
Employment relationships	Employment relationships
Workers' rights, including the right to join trade unions and to collective bargaining	Workers' rights, including the right to join labour unions and to collective bargaining
Working conditions and social protection	Forced labour
Forced labour	Child labour
Child labour	Discrimination in employment and occupation
Discrimination in employment and occupation	
Cap on weekly working hours	
Health and safety at work	

Economic and business issues

ISO 26000	UNGC
Fair operating practices	Anti-corruption
Anti-corruption	Indirect transparency and disclosure of information, as annual reporting to enterprises is required
Responsible political involvement	
Organisational governance	
Fair competition	
Transparency	
Respect for property rights	
Promoting social responsibility in the value chain	

4 Results and findings

The main results and findings of this study are:
- The issue of the individual indexes (Jankalova, 2013) is the objectivity of the data collected, since the sources are personal interviews, annual reports, websites, reports on sustainable improvement and appropriate environmental protection of analysed organizations. In spite of verification by the independent auditor, these articles often show signs of individual reality due chiefly

mutual incomparability of data. Another issue is transparency in the evaluation of CSR maintained by rating agencies, because these agencies often use a methods which is not reveal, because it is their know-how. Some rating agencies announced indexes that assess only the organization's reputation. In that case, the starting point is stakeholders' views on the organization acquire especially by questionnaire survey. The issue in that case is known facilitating of large organizations, as these communicate with the society more often than small, of which beneficial and constructive activities know often only small group of people.

■ Noticed indexes are the basis for sustainable investments too. The issue is that, since individual indexes are various in analysed fields and also in indicators in the different areas and scales defined for each field, it is very crucial to compare these indexes.

Incomparability of indexes also cause:
■ The different definitions of CSR that confusedly identify the desired performance of the business entity. While in foreign countries, we can talk more about corporate philanthropy (for many organizations is that aid to foundations and support non-profit projects) in Europe CSR mirrored in integration of principle fields of CSR into the business strategy of the organization.
■ Different functions of sustainable indexes.

5   Conclusion

The analysis of sustainability indexes is presented as review of analysis on structure, function and application of sustainability indexes in the article. The results of these data are stated in the part 4. This article is based on information gathered through extensive literature review (research studies, research publication, documents about sustainability indexes using web and research databases and the author's own experience).

The field of the corporate social responsibility evaluation also involved a number of standards and initiatives, which differ in sphere and function for which they were constructed. For the instances are UN Global Compact principles, Global Sullivan Principles, OECD guidelines for multinational companies, Ethical Trading Initiative Base Code and ISO 26000 corporate responsibility standard. For company reporting are essential standards as Global Reporting Initiative, World Business for Sustainable Development Reporting Project and AA1000 AccountAbility/Assurance Standard. As the starting point in this field can be considered ISO 26000 corporate responsibility standard, even though it does not

serve the evaluation level of corporate social responsibility and even it is not designed for the functions of certification. It is "only" a scheme for social responsibility and is used by a large number of organizations as a way of achieving and managing performance in this appreciation. (ISO, 2014) It helps clear up what social responsibility is, helps to institutions and organizations explain principles into effective actions and shares best procedure from around the world relating to social responsibility. Actual, it is a willing guidance in the field of the management, protection of human rights and the environment, labour practices, responsible business and to support the improvement of relations with stakeholders. By accepting the requirements of this standard, organizations undertake to comply with the principle of social responsibility in all three dimensions of sustainable improvement – economic, social and environmental.

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SELF-EMPLOYMENT AS A FORM OF ENTREPRENEURSHIP DEVELOPMENT IN RURAL AREAS IN POLAND

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Abstract

The complex socio-economic situation of the Polish rural areas and agriculture points to the need to reorient a significant part of the rural population, who should strive to undertake non-agricultural activities, mainly through self-employment. This study focuses on the issue of self-employment in rural areas. Since the early 1990s, the labour market in rural areas in Poland has undergone major political and economic changes. The purpose of this study is to explore the issue of self-employment as a form of entrepreneurship development in rural areas. This topic is presented as one of the elements of the labor market policy. In the research procedure, available secondary data were used, i.e. statistical data and the literature. Quantitative and qualitative analysis of self-employed persons from rural areas in Poland was also conducted. The presented data show a tendency towards positive changes in the group of self-employed persons from rural areas in the analyzed period.

Keywords: *self-employment,Poland, rural areas, entrepreneurship, development.*

JEL classification: *J2, J1, J6. L26, R11, R58, O1.*

1   Introduction

Self-employed entities constitute a specific category of companies belonging to the sector of small and medium-sized enterprises (SMEs). The phenomenon of self-employment can be viewed from various angles, e.g. sociological, economic or legal. From the point of view of entrepreneurial theory, a self-employed person is an entrepreneur (Piasecki, 1998, p. 97). From a macroeconomic standpoint,

meanwhile, self-employment is one of the ways to make the labor market more flexible and is important in terms of unemployment.

This study focuses on the issue of self-employment in rural areas. Since the early 1990s, the labor market in rural areas in Poland has undergone major political and economic changes, European integration, globalization, demographic processes and the economic crisis (Zgliczyński, 2010). After 1990, the labor market in rural areas has coincided with agricultural activity less and less. Employment went down, unemployment went up, income from agricultural activity and living standards of rural households decreased. The changes taking place in rural areas in Poland are also one of the results of the overproduction of food, which forced the farms to increase the specialization and concentration of their production resources. Consequently, this leads to a drop in demand for labor, which in turn aggravates the problem of unemployment and the associated pauperization. The population so far operating exclusively within the realm of agricultural holdings is now increasingly taking actions to change their sources of income, including by means of small entrepreneurship (Otłowska, Buks, Chmieliński, 2006). This raises the question about the role of self-employment in Poland's rural areas, whose residents have been struggling with lower entrepreneurship rates than urban dwellers ever since the transformation period (Central Statistical Office, 2016, p. 172; Central Statistical Office, 2011, p. 171).

The purpose of this study is to explore the issue of self-employment as a form of entrepreneurship development in rural areas. This topic is presented as one of the elements of the labor market policy. In the research procedure, available secondary data were used, i.e. statistical data and the literature. Quantitative and qualitative analysis of self-employed persons from rural areas in Poland was also conducted.

2 Self-employment as a form of entrepreneurship development in rural areas - theoretical basis

2.1 Conceptualinconsistencyof "self-employment"

Self-employment as a category of work is a quite intuitive and formally unspecified concept. In general terms, self-employment determines the situation in which a self-employed person bears all property consequences and economic risks associated with the performance of his or her business activity (Szanciło,2005).

Here is no uniform, common definition of self-employment in Poland nor in any European country. In the Netherlands, for example, it is a person working on his on her own account, mainly as a subcontractor for another company. In

France, meanwhile, the concept of self-employment is reserved for entrepreneurs who are not employed in their enterprise, but may or may not hire employees. Self-employment in France is not limited to subcontracting since consumers can also be customers (Official Journal of the European Union, 2013). In Belgium, self-employment ("indépendants") includes freelancers as well as entrepreneurs who are sole proprietors, assignees (managers) in one-person companies, active partners ("associéesactifs"). Self-employment in Belgium is thus equivalent to setting up a self-run business. In that case, one of the prerequisites is that the owner or his/her spouse or assistant demonstrates the ability to manage the company (Embassy of the Republic of Poland in Brussels).

Also in Polish legislation and classifications of employment status, the term "self-employment" is not clearly defined.

The word "self-employment" is never mentioned in the basic legal act that regulates running a business in Poland, i.e. in the Act on the Freedom of Economic Activity of 2 July 2004 (The Act 2004). Art. 2 of the Act explains only the concept of economic activity, which is gainful activity involving manufacturing (production), construction, trade, service and exploration, recognition and extraction of minerals from deposits, as well as professional activities, carried out in an organized and continuous fashion. On the other hand, an entrepreneur within the meaning of the Act is a natural person, a legal person and an organizational unit that is not a legal person, whose legal capacity is granted under a separate act - conducting business activity on their own behalf. In addition, partners of a civil partnership are also considered entrepreneurs in the scope of their business activity (Art. 4).

The term "self-employment" does not appear in the nomenclature of Polish official statistics, although the category "working on one's own account" is used. This group includes "employers", which means that it is possible to separate a group of self-employed persons who do not hire other people (that is, they are not employers).

As a consequence of the inconsistent definition of self-employment, diverse values characterizing the structure and phenomena associated with this category can be found in the literature.

2.2 The role and support of entrepreneurship in rural areas

The complex socio-economic situation of the Polish rural areas and agriculture points to the need to reorient a significant part of the rural population, who should strive to undertake non-agricultural activities, mainly through self-employment. However, rural areas are marked by low population density and entrepreneurship is particularly difficult in such circumstances. This is also confirmed by

the employment rate of the rural population in Poland, which, despite the growth, still fares unfavorably against the background of most EU countries, ahead only of Bulgaria, Croatia, Greece, Spain, Malta, Hungary and Italy (Frenkel, 2015). This is especially true for women and older people aged 55-64, and concerns slightly less the 15-24 age group. Endogenous entrepreneurship is now perceived as an important strategy for rural development and an important way to achieve competitiveness in rural and peripheral areas (Dinis, 2006). Among the significant local factors affecting entrepreneurship in rural areas are: demographic potential, absorption of the local labor market, size and type of unemployment, capital resources of the population, market absorption, technical infrastructure of local significance, state of the natural environment, aspirations of the local community, competence and resilience of local government, number and efficiency of institutions in business environment, tradition of entrepreneurship development. It is worth noting that without new jobs outside agriculture, the income of the rural population will not increase, and thus the modernization of rural areas will not be possible. The main barriers to entrepreneurship development in rural areas are (North, Smallbone, 2006):

- weakness of business environment - lack or insufficient training-and-consulting, information, financial, research-and-development and local-government institutions, which should support the creation of business entities,
- low integration and coordination of support programs and strong sectorality,
- quantitative rather than qualitative attitude in back-to-work schemes for the unemployed,
- excessive bureaucracy,
- insufficient activities that could effectively trigger the endogenous potential of rural residents,
- promoting solutions not always adapted to the real needs of rural residents, especially those located peripherally in relation to cities.

It is desirable to implement policies for stimulating potential sources of entrepreneurship and overcoming barriers to entrepreneurship development (North, Smallbone, 2006). Necessary are entrepreneurial activities that contribute to local development and improvement of the quality of life of rural residents. It is important to take into account the specificity of territorial capital, which will allow to develop and apply support measures for entrepreneurship with a distinction between rural and urban areas. Consequently, in line with the new paradigm of rural development, the promotion of entrepreneurship should be more holistic

and form an integral part of any development plan of rural areas (North, Small-bone, 2006; Korsgaard, Müller, Tanvig, 2015).

The development of self-employment is important from the standpoint of labor market policy as it contributes to a drop in unemployment and a rise in entrepreneurship. That is why this activity of the unemployed is supported by governments and EU programs. The development of entrepreneurship in rural areas in Poland is most strongly encouraged under the Polish Rural Development Program, focused mainly on the development of agricultural entrepreneurship. With that being said, other operational programs, e.g. "Knowledge Education Development 2014-2020", also provide assistance in this area. EU support programs are mainly aimed at eliminating the three most serious obstacles to the development of rural entrepreneurship - investment, education and infrastructure. The main intervention tools are direct subsidies for entrepreneurs, training programs as well as infrastructure development, which can act as stimulators of economic growth. The priorities of the European Commission regarding the Rural Development Policy (RDP) after 2013 are continuation and development of support measures in the period following Poland's accession to the European Union (Barska, Wyrwa, Jędrzejczak-Gas, 2016). The comprehensive support offered by the RDPstrives for sustainable growth, maintaining the vitality of rural areas and increasing the competitiveness and profitability of the agricultural sector. The most important RDP objectives for 2014-2020 are (Gwizda, Kosewska-Kwaśny, Żółciński, 2014):

- improving the competitiveness of agriculture,
- sustainable management of natural resources and measures to counteract climate change,
- balanced territorial development of rural areas, including creation and maintenance of jobs.

It is worth noting that if no integrated measures are taken to provide conditions conducive to the development of rural entrepreneurship, these regions will be exposed to further marginalization. As regards the circular model of civilization degradation in rural areas (Figure 1), should the circle become interrupted at any point, it may trigger a stagnation and permanent civilization collapse in a given area.

Figure 1 **Circular model of civilization degradation of rural areas**
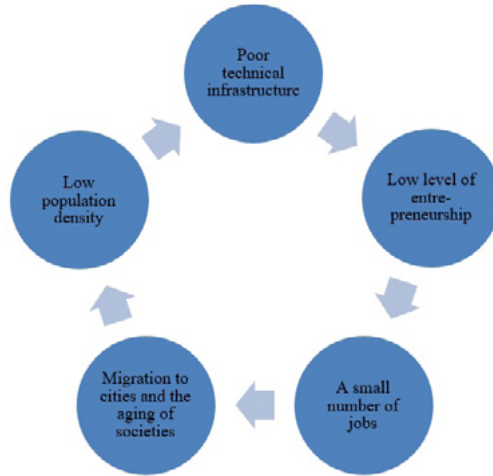
Source: The New Rural Paradigm: Policies and Governance, OECD Publishing, Paris 2006.

3   Data and Methods

Analysis and evaluation of self-employment in rural areas in Poland was carried out on the basis of generalized results of the representative Labor Force Survey (Polish: BAEL), as conducted by the Polish Central Statistical Office (Polish: GUS). The study covered the fourth quarters of the years 2012-2016. Choosing that particular research period was conditioned by the limited availability of statistical data. As of the third quarter of 2012, methodological changes were introduced in BAEL and these results proved not fully comparable with the results of previous surveys. The data for the fourth quarter of 2016 is the latest data published by GUS.

In order to make a quantitative and qualitative assessment of self-employment in rural areas, a comparative analysis of indicators of self-employment in cities and rural areas was conducted. The subject of the analysis and assessment were the following indicators: dynamics of total self-employment, share of self-employment in total employment, dynamics of self-employment in selected sections of the Polish Statistical Classification of Economic Activities (PKD),share of self-employment in total employment in selected sections of PKD.

Given that there is no formal, consistent definition of self-employment, and BAEL does not directly refer to the term "self-employment", only "working on one's own account", separate calculations of the rate of self-employment were made. The size of self-employment and the indicators presented above were estimated according to the definition proposed in the Polish literature, according to which self-employment is a form of work carried out individually one one's own account as an independent, non-agricultural business within a single enterprise or as a civil-law contract itself (e.g. contract for specific work), or in the case of tasks of a wider scope - with the help of co-workers, where a direct, personal and superior work contribution of the self-employed person is necessary in order to fully perform this task and possible cooperation with other people is temporary, non-continuous (Lasocki, Skrzek-Lubasińska 2017, p.11).

In this study, a definition was adopted according to which self-employment includes persons who are not employers and run business within the meaning of the Act that governs business in Poland (The Act, 2004), i.e. PKD, excluding the production activity of Section A - agriculture, forestry, hunting and fishing.

4   Results and Discussion - he state and dynamics of self-employment in rural areas in Poland

In 2012[1], there were over 13.7 million employed persons in Poland, of whom almost 4.4 million were from rural areas (31.8%). In the analyzed period, both the number of employed people and the working population of rural areas systematically increased by 6.8% and 13.2%, respectively, compared to 2012. Hence, in 2016, over 14.6 million people worked in Poland, of whom 4.9 million were employed rural residents (33.7%) (Table 1).

In 2012, the total number of self-employed persons was 980,000, of whom 219,000 were self-employed rural residents (22.3%). In the analyzed period, the number of self-employed peopled systematically increased. In 2016, compared to 2012, the number of self-employed persons in total increased by 14.1%, with the number of self-employed urban residents increasing by 6.4% and the number of self-employed rural residents increasing by as much as 40.6%. Hence, in 2016, the number of self-employed persons totaled 1,118,000, of whom 308,000 were self-employed rural residents (27.5%). In the analyzed period, there was an increase in the share of self-employed rural residents (and thus a decrease in self-employed urban residents) by 5.2 percentage points (Table 1).

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[1]   All data presented in this paper relate to the fourth quarters.

In the entire analyzed period, the share of self-employed persons in total employment was lower in rural areas than in cities. In each of the analyzed years, the rate remained for the most part unchanged (approx. 8%) for urban residents, while systematically growing for the self-employed rural population to reach 6.2% in 2016 (against 5% in 2012). While in 2012 the difference between the rate for self-employed residents of urban and rural areas was 3.1 percentage points, in 2016 it went down to 2.1 percentage points (Table 1).

Table 1 **Self-employment in Poland in 2012-2016**

Description		2012	2013	2014	2015	2016
Total employment						
in thousands	Total	13728	13863	14175	14454	14664
	Urban	9367	9416	9609	9790	9726
	Rural	4361	4447	4566	4664	4938
previousyear =100	Total	-	101.0	102.3	102.0	101.5
	Urban	-	100.5	102.0	101.9	99.3
	Rural	-	102.0	102.7	102.1	105.9
Self-employment						
in thousands	Total	980	967	1023	1036	1118
	Urban	761	752	779	780	810
	Wieś	219	215	244	256	308
previousyear =100	Total	-	98.7	105.8	101.3	107.9
	Urban	-	98.8	103.6	100.1	103.8
	Rural	-	98.2	113.5	104.9	120.3
Share of self-employment in total employment						
%	Total	7.1	7.0	7.2	7.2	7.6
	Urban	8.1	8.0	8.1	8.0	8.3
	Rural	5.0	4.8	5.3	5.5	6.2

Source: Own study based on: Central Statistical Office, 2013, 2014, 2015, 2016, 2017.

In the analyzed period, the majority of self-employed persons, both from cities and rural areas, ran companies dealing with trade and repairs. These were also the sectors where most jobs were created. Construction came out second and industrial processing third (Table 2).

Description		2012	2013	2014	2015	2016
Total (except for agriculture, forestry, hunting and fishing)	Total	980	967	1023	1036	1118
	Urban	761	752	779	780	810
	Rural	219	215	244	256	308
Manufacturing	Total	89	89	99	102	117
	Urban	58	53	59	64	70
	Rural	31	36	40	38	47
Construction	Total	175	174	156	172	198
	Urban	104	108	93	91	106
	Rural	71	66	63	81	92
Trade and repair of motor vehicles	Total	274	265	272	267	243
	Urban	193	178	176	174	146
	Rural	81	87	96	93	97
Transportation and storage	Total	87	76	83	90	91
	Urban	62	53	57	65	64
	Rural	25	23	26	25	27
Education	Total	21	33	28	28	32
	Urban	21	27	23	24	28
	Rural	-	6	5	4	4
Human health and social work activities	Total	64	69	71	77	79
	Urban	50	55	60	65	65
	Rural	14	14	11	12	14

Source: Own study based on: Central Statistical Office, 2013, 2014, 2015, 2016, 2017.

Analyzing the change in the number of self-employed persons in the period under consideration for selected PKD sections, it can be observed that for all sections there are significant amplitudes of fluctuations in the dynamics indices calculated in relation to the previous year. Analyzing the changes that occurred in 2016 in comparison with 2012, it can be seen that the highest increase was recorded for self-employed residents of rural areas operating in industrial processing (an increase by almost 52%). In 2016, still compared to 2012, 4 sections (industry, construction, trade and repairs of motor vehicles, transportation and storage), the number of self-employed rural residents increased to a much greater extent than

for urban residents. The opposite applied to only 2 sections (education, health care and social assistance) (Table 3).

Table 3 **Dynamics of self-employment in Poland in different PKD sections, in 2012-2016**

Description		2013	2014	2015	2016	2016
		previousyear =100				year 2012=100
Total (except for agriculture, forestry, hunting and fishing)	Total	98.7	105.8	101.3	107.9	114.1
	Urban	98.8	103.6	100.1	103.8	106.4
	Rural	98.2	113.5	104.9	120.3	140.6
Manufacturing	Total	100.0	111.2	103.0	114.7	131.5
	Urban	91.4	111.3	108.5	109.4	120.7
	Rural	116.1	111.1	95.0	123.7	151.6
Construction	Total	99.4	89.7	110.3	115.1	113.1
	Urban	103.8	86.1	97.8	116.5	101.9
	Rural	93.0	95.5	128.6	113.6	129.6
Trade and repair of motor vehicles	Total	96.7	102.6	98.2	91.0	88.7
	Urban	92.2	98.9	98.9	83.9	75.6
	Rural	107.4	110.3	96.9	104.3	119.8
Transportation and storage	Total	87.4	109.2	108.4	101.1	104.6
	Urban	85.5	107.5	114.0	98.5	103.2
	Rural	92.0	113.0	96.2	108.0	108.0
Education	Total	157.1	84.8	100.0	114.3	152.4
	Urban	128.6	85.2	104.3	116.7	133.3
	Rural		83.3	80.0	100.0	
Human health and social work activities	Total	107.8	102.9	108.5	102.6	123.4
	Urban	110.0	109.1	108.3	100.0	130.0
	Rural	100.0	78.6	109.1	116.7	100.0

Source: Own study based on: Central Statistical Office, 2013, 2014, 2015, 2016, 2017.

In the entire analyzed period, the share of self-employed persons in total employment varied depending on the type of economic activity. The highest rates, both for rural and urban residents, were recorded in construction, trade and repairs as well as transportation and materials management, while the lowest concerned

education and manufacturing. This rate systematically increased mainly with respect to rural residents self-employed in construction and industrial processing.

Table 4 **Share of self-employment in total employment in Poland in selected PKD sections, in 2010-2016 (%)**

Description		2012	2013	2014	2015	2016
Total (except for agriculture, forestry, hunting and fishing)	Total	7,1	7,0	7,2	7,2	7,6
	Urban	8,1	8,0	8,1	8,0	8,3
	Rural	5,0	4,8	5,3	5,5	6,2
Manufacturing	Total	3,0	2,9	3,2	3,2	3,6
	Urban	3,3	2,9	3,2	3,4	3,7
	Rural	2,6	2,8	3,1	3,1	3,4
Construction	Total	14,1	15,0	13,1	13,8	15,9
	Urban	14,8	15,8	13,8	13,0	15,2
	Rural	13,2	13,6	12,3	14,9	16,8
Trade and repair of motor vehicles	Total	12,2	11,8	11,7	11,2	10,3
	Urban	12,3	11,4	11,3	11,0	9,6
	Rural	11,7	12,6	12,3	11,7	11,5
Transportation and storage	Total	9,3	8,2	9,1	9,3	9,5
	Urban	10,8	9,0	9,5	10,7	10,4
	Rural	7,4	6,9	8,2	7,1	7,5
Education	Total	2,0	2,3	2,2	2,2	2,7
	Urban	2,4	3,0	2,5	2,6	3,4
	Rural	-	1,7	1,5	1,2	1,1
Human health and social work activities	Total	6,3	6,8	7,5	7,7	7,8
	Urban	7,0	7,9	8,6	8,9	9,1
	Rural	5,7	5,4	4,3	4,5	4,8

Source: Own study based on: Central Statistical Office, 2013, 2014, 2015, 2016, 2017.

4   Conclusion

Unfavorable socio-economic phenomena are observed in rural areas in Poland. Among these phenomena, the following should be mentioned: the declining role of agriculture as a source of income, unfavorable structure and relations of production factors, high unemployment and undeveloped labor force surplus, and

income disparity of rural households. These factors force residents of rural areas to seek solutions aimed at creating sources of non-agricultural income. The antidote to the unfavorable situation in rural areas in Poland may be rural entrepreneurship implemented through self-employment, which is an important factor in the economic "activation" of rural areas in Poland. The presented data show a tendency towards positive changes in the group of self-employed persons from rural areas in the analyzed period.

Analysis and evaluation of the self-employment rates contained in this paper indicate that:

– In the analyzed period, the number of self-employed persons systematically increased. In 2016, the number of self-employed from rural areas increased by as much as 40.6% compared to 2012(the number of self-employed persons from urban areas increased by only 6.4%).

– In the entire analyzed period, the share of self-employed persons in total employment was lower in rural areas than in cities, but it systematically increased, which made the existing gap decrease from 3.1 percentage points in 2012 to 2.1 percentage points in 2016.

– Out of all PKD sections, the highest growth in the number of self-employed persons concerned rural residents working in industrial processing, with an increase of almost 52% compared to 2012 (with an increase of 21% in cities).

– In 2016, compared to 2012, the number of self-employed rural residents increased more than that of self-employed urban residents in four sections (industry, construction, trade and repairs of motor vehicles, transportation and storage); the opposite applied to only 2 sections (education, health care and social assistance).

The development of entrepreneurship at local level is largely dependent on the interaction of variables such as: involvement of local government, investment attractiveness of the commune (Polish: *gmina*), and entrepreneurial attitudes of rural residents. It is important to make farmers' families aware of the need to seek income from several sources. According to K. Gutkowska, the so-called "activation" of entrepreneurship in rural areas may be implemented through: development of rural infrastructure, development of agricultural products, use of local mineral resources, use of production resources of rural areas, including environmental resources and landscape values (Gutowska, 2009). Also noted should be the importance of various governmental and EU back-to-work schemes and

programs (such as non-repayable grants or training), aimed primarily at the unemployed.

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THE ESSENCE OF RURAL ENTREPRENEURSHIP IN THE CONTEXT OF BUSINESS ACTIVITY MANAGEMENT IN RURAL AREAS

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Abstract

The structural transitions that occur in the rural environment and agriculture are connected with the process of the establishment and development of enterprises in rural areas, with its major instrument being broadly understood entrepreneurship. The aim of this paper is to present the problems of rural entrepreneurship. The results obtained in the study were used to present the essence of rural entrepreneurship in the context of business activities management in rural areas with the example of a territorial division entity i.e. the Częstochowa powiat in the central part of Poland. The research methodology was a questionnaire survey in a group of 135 farmers from the area of the powiat.

Keywords: *business activity, management, rural areas, rural entrepreneurship*

JEL classification: *F50, Q1, R10*

1   Introduction

As the most important manifestation of rural business activity in Poland, agriculture is currently being ousted by other forms of entrepreneurships, termed non-agricultural business activities. The most important reason for which people

in the country are involved not only in agriculture is that fewer and fewer owners of farms are able to make a living from agriculture. Reduction of the role of agriculture and increased importance of entrepreneurship (Drucker, 2006; Gregorczyk, Romanowska, Sopińska & Wachowiak, 2010) in rural areas is a process that forces a number of transformations in these areas, aimed mainly to develop entrepreneurship in the agriculture and modernize, simplify and promote specialization of farms, and develop various non-agricultural forms of entrepreneurship (Barczyk, 2008; Nowak, 2004).

The aim of this study is to present the idea of rural entrepreneurship in the context of business activities management in rural areas with the example of a territorial division entity i.e. Częstochowa powiat (powiats are principal units of territorial division of the second level in Poland).

The Częstochowa powiat is located in the southern part of Poland in the Silesian Voivodeship. Its area is around 1,519 km², with the population of roughly 135,500 people. Its office is situated in Częstochowa, a city located outside its territory. The powiat includes two municipal-rural gminas (the units of territorial divisions of the first level): Blachownia and Koniecpol and 14 rural gminas.

2   Forms of Rural Entrepreneurship

The structural transitions that occur in the rural environment and agriculture are connected with the process of the establishment and development of enterprises in rural areas, with its major instrument being broadly understood entrepreneurship (Glaeser & Kerr, 2010). „Development of entrepreneurship in rural areas is defined as the attitudes and all organizational and management activities in the enterprise, based on the motivations of earning profits, innovation, competition, risk and responsibility of the entrepreneur"(Faggio & Silva, 2014). It should be perceived as a factor in deagrarianization of rural areas through (Castano, Mendez & Galliano, 2015):

- opportunities for moving agricultural population to work outside agriculture,
- process of industrialization of agriculture and urbanization of rural areas,
- structural changes in the agrarian structure due to the increase in the size of farms owned by part of farmers and liquidation or reduction of farms by others.

The phenomenon of rural entrepreneurship results from the initiatives made by population living in rural areas in order to find a niche corresponding to their own potential. Entrepreneurship in rural areas in Poland is characterized by a variety of forms and number of rural business entities that include mainly small and medium-sized enterprises, whose activity is becoming more and more important

to the development of a number of rural regions of the country (Adamowicz, 2004). Therefore, the basic component of entrepreneurship in rural areas is small business.

Entrepreneurship of the inhabitants of rural areas is manifested in business activity in the person's place of residence and in the nearest cities. Through establishment of the businesses and purchasing the means of production and consumption, these individuals participate in business activity located in the areas of the nearest city (Darmadji, 2016). Local business activity of entrepreneurs, which consists in the development of small and medium-sized businesses in the nearest cities is one of the forms of non-agricultural business activity in rural areas. Currently, with the opportunities for efficient communication between the cities and rural areas, the inhabitants of the cities contribute to business activation of rural areas through establishment of enterprises in these locations (Heller, 2007).

Farmers belong to the category of sole traders, thus making farmers entrepreneurs. Entrepreneurial managers of farms have to learn about how the market they function in operates and which products should be manufactured. The farmers have to learn entrepreneurship using three traditional factors of production: land, labour and capital. Entrepreneurship is a specific characteristic that cannot be replaced by anything else (Santarelli & Vivarelli, 2007). The owners of farms represent a group of entrepreneurs, who more and more often use economical factors in their activity (Cichoń, 2015). It is important in farmer's activity to perform market surveys and collect market information, which allows for the effective competition and the achievement of competitive position in the market (Stachowicz, Nowicka-Skowron & Voronina, 2014).

Entrepreneurship in rural areas can therefore adopt various character and be expressed in various forms and methods of operation. The Figure 1 presents a general division of rural entrepreneurship.

Figure 1 **Entrepreneurship in rural population**


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┌─────────────────────────────────────────────┐
│       Entrepreneurship of rural inhabitants   │
└─────────────────────────────────────────────┘
          │                         │
   ┌──────────────┐          ┌──────────────────┐
   │ Agricultural │          │ Non-agricultural │
   └──────────────┘          └──────────────────┘
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Increase in production scale	Change in products - among others: food trade, sorting, confectioning, transport, small processing of food raw materials and hardening of food products	Non-agricultural business activity of the owners of agricultural farms - among others: supplying materials and means of production; production services, including mechanization, renovation and construction, in the field of plant protection, purchase, storage, transport and trade in agricultural products, agro-food processing	Any forms of business activity of people not connected with agriculture – among others: rural tourism, forest management, landscape care and environmental protection, and other types of non-agricultural production and services

Starting a farm,
it also includes: modernization of farms, change of existing designs and production attitudes, and team activities and broadly understood agribusiness

Source: Author's own elaboration on the basement of: Kozłowska-Burdziak, 2008.

Non-agricultural business activity in rural areas can be divided into the following categories (Suryana, 2006):
– activity connected with the industry and services located in rural areas,
– activity connected with workplaces in cities (so-called residential function of rural areas),
– activity connected with services for people visiting rural areas (recreation, tourism, agritourism),
– activity of people making a living from non-productive sources of income (pensioners, retired people).

The entrepreneurship of farmers is manifested in their attempts to enrich and enhance the products they obtain in their farms. This means storage and processing using their own resources and capabilities of the farm, village or gminas. Various opportunities are opened up in rural areas, confirmed by actual activities, which include, among others, multiple initiatives, such as (Kościelniak, 2013):
– traditional, rural baking,
– manufacturing smoked meat according to traditional Polish recipes and modern methods,
– production and enhancement of ovine leather,

- weaving at home,
- picking up forest berries and mushrooms,
- picking up and drying natural medical herbs,
- beekeeping, farming edible snails and fur-bearing animals.

The above entrepreneurial activities demonstrate ingenuity and resourcefulness of people living in rural areas. A number of these initiatives do not require much capital expenditure but the benefits can be substantial.

3   Questionnaire survey design

The survey was conducted in winter 2016. The preparation for the survey started from developing the questionnaire. The data were collected from 29 May to 3 June. On the last day of the survey, the collected data were organized and presented in the form that refers to the methodological assumptions.

The spatial scope of the examination included a part of the Częstochowa powiat in the central part of Poland, composed of the two types of gminas: mixed municipal and rural gmina (Blachownia and Koniecpol) and four rural gminas (Mykanów, Kłomnice, Poczesna and Konopiska).

The empirical analysis presented in the further part of the paper is based on primary sources. The major source of the presented data is questionnaires (135) dedicated to powiat farmers. The questionnaire survey was carried out using a direct method through personal contacts with respondents. The questionnaires were obtained only by people who wanted to participate in the survey. Only 35 of 170 questionnaires were not returned.

There were 135 inhabitants of rural areas in the Częstochowa powiat who participated in the survey. In each gmina, the survey examined 0.5% of people in the working age (18 to 64 years) who are the owners or co-owners of agricultural farms.

Based on the respondent data section, the most of the members of the population studied were inhabitants of two biggest gminas in the powiat: Blachownia and Koniecpol. The biggest group was people aged 35 to 44 years. In general the respondents had vocational education. The most of the respondents were owners of the farms with area of 3 to 10 ha. The dominant group was men (Kadłubek, materials in print).

4   Analysis of the results obtained from the survey

Entrepreneurship is not sufficiently popular in rural areas. This is confirmed by the fact that the statement: „*Inhabitants of rural areas are little active and little entrepreneurial*" was accepted by 39.3% of the studied population. The statement was confirmed by 53 people, including people aged 35 to 44 years (21 people) and 45 to 54 years (21 people). Among the representatives of local gmina governments, 50.0% of the respondents confirmed a low level of entrepreneurship of people from rural areas. The same number (50.0%) of the respondents could not answer unequivocally to this question. None of the members of local government denied this fact. 34.8% of the study participants answered „*No, I disagree*". The question was answered negatively by 62.5% of the respondents with higher education.

Interestingly, almost 26% of the respondents did not have any opinion on that issue. They indicated the last variant of the answer: „*It's hard to say*". The biggest difficulties with the answer to this question were presented by the inhabitants of the smallest gminas, aged less than 44 years, with secondary and post-secondary education. The preview concerning the level of entrepreneurship of people in rural areas is presented in Figure 2.

Figure 2 **Rural inhabitants and their entrepreneurship**
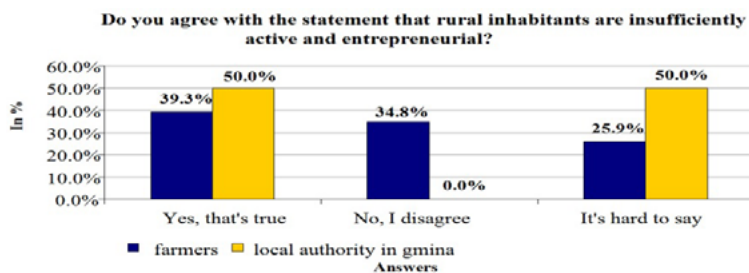
Source: Author's own elaboration.

Comparison of these two categories of respondents was aimed to demonstrate the differences in business activity of rural community. Similar to the members of gmina governments, owners of agricultural farms in the Częstochowa powiat responded that rural population is insufficiently active and entrepreneurial. The answers of the respondents demonstrated that business activity of rural inhabitants is not sufficiently popular yet. This fact is confirmed by an insignificant percentage of enterprises in the overall number of study participants.

When asked whether they ran or had ever run non-agricultural business activity, the most of the inhabitants of the Częstochowa powiat (64.5%) answered „No" (Figure 3). The farms not involved in any business activity represented a significant percentage of all the farms, especially in the Kłomnice gmina, where 85.7% of the respondents indicated this answer. None of the respondents who lived in this gmina had their own businesses and merely one person intended to register business activity. Business initiatives were not started by people without education and those who finished only primary schools.

In the area of the six analysed gminas, businesses were run by merely 6 people, which translates into only 4.4% of the respondents.

Figure 3 **Non-agricultural business activity of farmers**
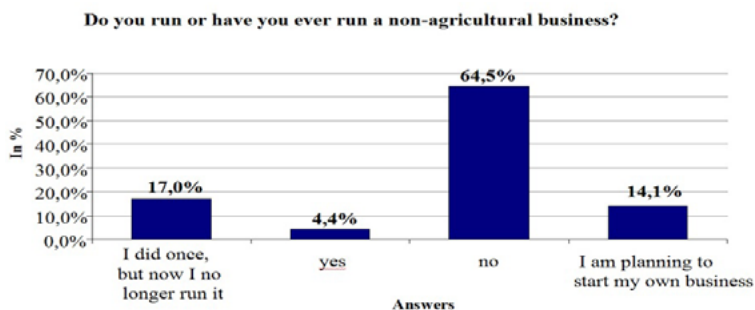
Source: Author's own elaboration.

The non-agricultural business activities started by rural inhabitants from the Częstochowa powiat included opening grocery shops (3 people), selling food products, production of wooden products (1 person), building services (1 person) and repairing cars (1 person). Business activity in the gminas studied was mainly found in people aged up to 44 years (5% of them were younger than 34 years) and with better education.

Business activity in people living in agricultural farms was substantially varied depending on sex of the respondents. 40.4% of the men participating in the survey were those who had ran their own businesses before, were still running business, or intended to start a business. Answer different than „No" was provided by only 24.4% women.

The entrepreneurship in the area studied showed a substantial variation between gminas although similar tendencies occur in their area concerning the participation of active and inactive people in business initiatives. It should be also noted that business activity of rural inhabitants, similar to cities, are

supplemented by the 'grey economy zone' where entrepreneurial activities adopt semi-legal character.

Identification of the most frequent motivations for starting and running business activity represented an interesting component of the characterization of the profile of a rural entrepreneur. The answers of the respondents who ran or intended to run their own business allowed for organization of the causes of business initiatives from the most to least significant (Figure 4).

Figure 4 **Motivations for starting business activity in rural areas**
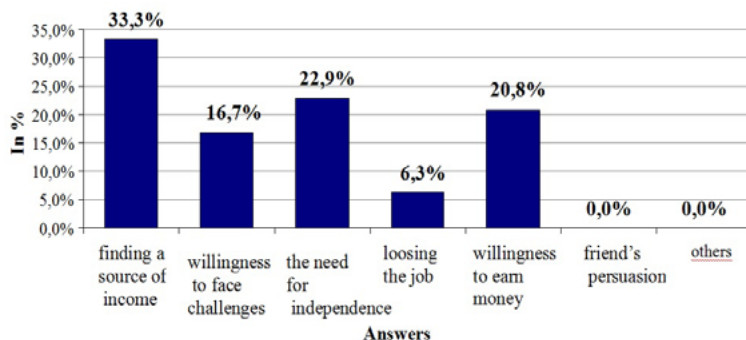
Source: Author's own elaboration.

The most important for the respondents is „*the willingness to provide myself and my family an additional source of income*". This motivation was indicated by 33.3% respondents. The need for association and reluctance to having a supervisor at work was on the second place (22.9%), whereas the third place was taken by the opportunities for earning money (20.8%). Among the motivations, the entrepreneurs also listed the need for facing challenges. Almost half of the sole traders who were the owners of their own businesses justified their motivations in this manner. To 6.3% of the respondents, starting business activity other than agricultural activity in rural areas was the necessity due to the loss of the previous job and the attempt to run away from unemployment. The effects of the economic duress connected with the risk of unemployment are noticeable in the case of people who ran or had run their businesses. The main stimulus for future entrepreneurs was, to the similar degree, independence and earning money (these motivations were indicated in total by 63.2% of potential entrepreneurs).

Another important element that identified people in rural areas was determination of the sources of their income. The answers of the respondents are shown in Figure 5.

Figure 5 **Sources of income in households in the Częstochowa powiat**

What are sources of income in your family?
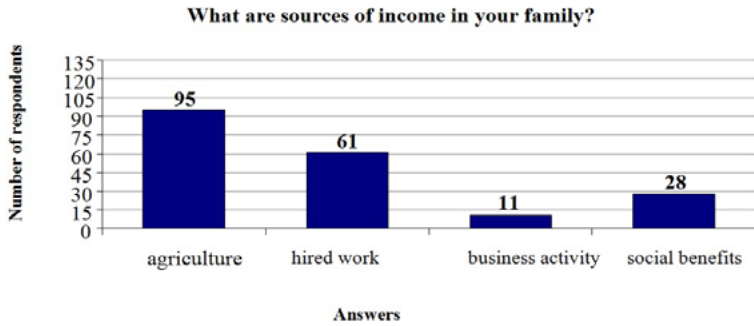
Source: Author's own elaboration.

The Częstochowa powiat is dominated by agriculture, which represents the main source of income in rural families. As shown in Figure 4, 95 respondents (70.1%) indicated agriculture and working in the farm as a source of income. Agriculture was the only source of income for 31.9% of the respondents. In general, the inhabitants of these areas prefer agricultural activity. However, almost 28% of the respondents indicated that they are unable to support their families from the agricultural activity. In this question, these people indicated answers other than working in their farms. This was the most noticeable in the case of small farms, where incomes on agricultural activity did not cover the costs of supporting the family, which forced farmers to seek other sources of income. Eleven respondents declared that they or someone from their family had their own businesses. Members of 61 farms were employed outside the farms, whereas 28 people used social benefits. The percentage of the households with only non-agricultural activity was insignificant. The group of self-employed people accounted for 2.2% of all participants of the survey. Only ca. 18% of the respondents in all gminas supported their families from working outside the farms. An insignificantly higher percentage was found for those who were also involved in agricultural activity, with the household member being hired workers. Their percentage in the total of the households examined was 21.5%. For 4.4% of the respondents, the only income was social benefits. Nearly 12.6% of the inhabitants of rural areas make a living from pensions, retirement pensions, benefits and agriculture.

Assessment of the financial status of the most of rural farms, including those in the area of the Włoszczowa powiat, is not easy. This is supported by the fact that 40.7% of people could not unequivocally answer to this question. They chose the option „*It's hard to say*". The most of the problems with the diagnosis of the

level of profitability were found for people who had large agricultural farms. In the gminas studied, agricultural activity was characterized by incomes depending on seasonal variability, i.e. the activity was sometimes profitable and sometimes not. Climatic conditions also had an effect on profitability, with financial standing of the farm owners changing frequently. Huge damages in rural areas are caused by natural disasters such as floods or droughts. All of this impacts on profitability of the entities. Other results of the survey in this area are presented in Figure 6.

Figure 6 **Profitability of farmers' activity**
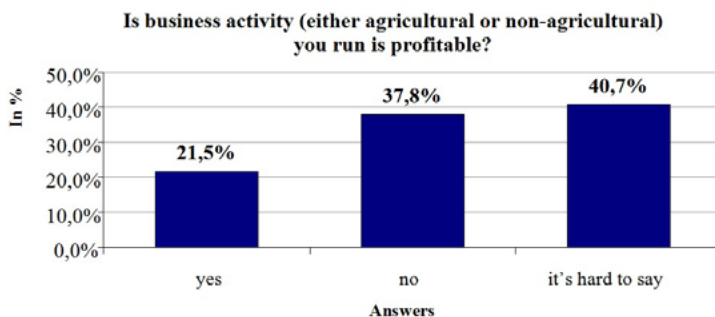
Source: Author's own elaboration.

In terms of profitability of the business activity, the dissatisfaction attitudes were more dominant compared to satisfaction. In the case of the question „*Is your business activity (agricultural or non-agricultural) is profitable?*" 37.8% of the respondents answered „*No*". The survey also showed that the least profitable activities are started in the farms with the area of 1 to 2 ha. Over half of the respondents from this range reported their activities as unprofitable. Fully profitable activity was indicated by 21.5% of farmers. Analysis of the opinions of the respondents showed that the older the respondents, the more disappointed they were concerning the effects of their work. The highest dissatisfaction in this area was found in the group of people aged more than 55 years. A negative attitude to the profitability of activities in the group of people aged 18 to 24 was reported only by 9.1%.

5   Conclusion

The paper was aimed to present the problems of rural entrepreneurship. The results of the questionnaire survey were used to present the idea of rural entrepreneurship in the context of business activities in rural areas with the example of a territorial division entity i.e. Częstochowa powiat.

The most of the participants were men. The biggest group was people aged 35 to 44 years. The most of the respondents were owners of the farms with area of 3 to 10 ha. The main source of income for farmers was working in the farm and hired work.

Similar to the members of gmina governments, owners of agricultural farms in the Częstochowa powiat responded that rural population is insufficiently entrepreneurial. The answers provided by the respondents revealed that business activity of rural population is little popular and this fact was confirmed by an insignificant percentage of owners of businesses in the overall number of study participants. In the area of the six analysed gminas, businesses were run by merely 6 people, which accounted for only 4.4% of the respondents.

To the most of the respondents, the key motivation for running or planning to start business activity was an additional source of income for themselves and their family. The answers to this question indicated that according to farmers, entrepreneurship means mainly the activity of people taken in order to find alternative sources of income.

The inhabitants of gminas included in the survey did not show tendencies for starting businesses, which was confirmed by the answers to other questions contained in the questionnaire. The results of the survey also confirmed that the typical agricultural activity, although it remains to be the basic source of incomes of people living in rural areas, ceases to be the means of supporting the whole household.

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THE RELATIONSHIP BETWEEN EMPLOYMENT, ECONOMIC GROWTH AND LABOR MARKET SCENARIO WITH RESPECT TO VISEGRAD COUNTRIES

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Abstract

This study is about analyzing labor markets and determinants of employment growth in Viswegrad countries. The purpose of this study is to provide an overview of those aspects of economic growth with respect to labor market that are important for interpreting data on the trade strategies-employment relationship and to indicate how Visegrasd countries covered in the project have fared with respect to growth of employment or reduce rate of unemployment, indirectly concerns with labor force and its market demand.

Another aim of the paper is to identify V4 labor market developments and to examine the impact of the economic development on them. The emphasis is being placed on the development of the selected specific unemployment issues youth and long-term unemployment as well as this allows us to identify several determinants which mitigate the effects of economic growth on employment.

Keywords: *employment, labor, economy, growth, Visegrad*

JEL classification: *J0, J6, O1,*

1   Introduction

On 1 May 2004, the Czech Republic, Hungary, Poland and Slovakia and further six states joined the European Union. The Visegrad Cooperation is the regional

organization of the four countries's known as the Visegrad Group or the Visegrad Four (The Czech Republic, Poland, Hungary and Slovakia).As from the beginning the growth potential of all Visegrad countries is unquestionable. though, the global economic crisis strike doors of V4 countries labor markets considerably, but another way. The purpose of this study is to discover V4 labor market developments and to study the brunt of the economic development on them. The importance is being sited on the development of the preferred definite unemployment problem and long-term unemployment situation.

The Visegrad Four or also V4 demonstrate numerous general factors partially due to their common history and their location, and in some extent due to their various similar social characteristics. Today, they are coupled by their joint accession to the European Union (Nyikos, 2003).

In current years, the jobless growth trend attracts much attention both in the media and the academic literature. Authors using the employment elasticity term studied a broad cross-section of countries around the world to explain why such a experience occurred in economies during the last decade. Kapsos (2005) expected that worldwide world employment elasticity is approximately 0.3, with considerable differences from province to province. These results imply that the amount of the reply of employment to transform in economic growth is around 30%. With the help of sample of 10 major states in the US, Döpke (2001) expected the employment power of economic growth to be 0.5.

The purpose of V4 country's cooperation is the united depiction of economic, diplomatic and political interests of these Central and Eastern European countries and the synchronization of their potential measures. The countries of the collaboration sustain good relationship with the nearby countries, which, as per to Balázs (1996), has a positive outcome on the procedure of the European incorporation. Relationship of the V4 countries shows a result of political debates in the 90s, but their agreement to the European Union initiate a new phase in the life of the four countries. According to Kégler (2003), Visegrad Cooperation characterizes an essential political incorporation within the European Union, whose members are concurrently partners and competitor in all sector of the economy. The main purpose of this group is to give most favorable assistance in all countries, specially their neighboring countries, for the reason that its most important concern is to accomplish democratic development in definite parts of Europe.

In this study , researchers try to find out determinants of employment growth in V4 countries. Although a standard approach relies on the parametric opinion of labor elasticity coefficients, we utilize a new move toward structural decomposition analysis. We crumble the general change in employment into the involvement of certain factors: changes in labor efficiency, changes in the import

of intermediary products. Here demonstrate that generally accepted persuade of labor efficiency growth on employment, further aspects such as structural changes and changes in final demand played an essential function in employment changes. These outcome lean-tos some light on less labor suppleness in V4 countries and go beyond the simple labor efficiency growth disagreement.

In spite of the evident importance of the topic, there are a imperfect number of research papers dealing with impacts of EU accession on the VC agriculture. Consequently, the aim of this study is to evaluate the status of the sector in the light of the latest available data as well as to identify the factors lying behind different country performances in the four Member States concerned.

1.1 Relationship between employment and economic growth

Relationship between economic growth and employment shows the aggregate production function. In other words, how much output produced for a given quantities of capital and labour. For example, we assume that aggregate production Y is using to inputs capital (K) and labour(L). It shows below equation. (But it is simple model)

$$Y_t = A_t\, K_t^{\alpha} L_t^{\beta}$$

where: Y_t – Gross domestic production
A_t – Factor of productivity
K_t^{α} – Quantity of capital
L_t^{β} – Quantity of labor

Furthermore, Okun's law shows the relationship between employment and economic growth. Okun's law stated that on supply side for every one percentage point of the actual unemployment rate exceeds the natural rate of unemployment; real gross domestic product is reduced by 2.5%. Hence, economic growth is increasing depends on employment growth.

Before 1990, Visegrad group countries were based mostly extensive growth, the transformation of our economies led to a more intensive use of labor force. Later, in 2001-2006, labor productivity growth in the V4 countries was faster than the average of the EU-15 (P. Bielik,M. Rajčániová, 2008).

P. Bielik, M. Rajčániová, (2008) that paper study in employment growth in V4 country by shift-share analysis. Shift-share analysis enables the decomposition of employment growth into sectoral-mix effect, competitive effect and residual effect. The result, in Slovakia, the unemployment rate was relatively high which has barrier for economic growth. In Czech, labor market was most efficiency and in Hungary's unemployment rate was from 6 to 8 percent. The most complicated

situation was observed in the labor market of Poland, where the employment rate has had a decreasing tendency since 1998 until 2004. In sector, the agricultural sector's employment decreased in all country. Especially, the most decrease was in Slovakia.

Katalin Lipták, (2010) studied analysis of employment situation in V4 countries who analyze employment policy, unemployment and about the economic situation. In this study, using the data between 1998 and 2009, showed the government deficit as a percentage of GDP, GDP per capita in percentage of the EU-25 and labor market which is employment rate, unemployment rate for V4 countries. Especially, unemployment rate was highest in Slovakia and Poland between 2000 and 2005. In Hungary, Czech Republic countries unemployment rate was fluctuated between 5 percent and 7 percent. These countries economic situation and employment growth were improved accession in EU from 2004. And, these countries economic and labour market situation was very different.

William Seyfried(2003)in this study, he examined relationship between employment and economic growth in the ten largest countries. He used the employment intensity of economic growth model developed by Boltho and Glynn (1995). In this study result, the elasticity of employment with respect to real GDP was estimated to be 0.47 using a pooled regression while ranging from 0.31 to 0.61. His result is similar to those found by Padalino and Vivarelli(1997). Results showed that though economic growth has effect on employment, the effects continue for a few quarters. In other words, economic growth has a positive impact on employment growth.

2   Research Methodology

The methodological approach is mainly descriptive; the analysis will be based on relevant statistical data from different research articles, reports and policy papers and comparative analysis of statistical data from national and international databases, in these research researchers choose Eurostat database till year 2013 due to availability of exact relevant numbers which was required for analysis of research.

If we will compare current situation i.e. 2017 with compare to 2013 there is not much difference with numbers which express today's situation of economic growth with reference to labor market scenario of V4 countries.

3   Result and discussion

3.1   Economic growth in the V4 countries

Looking towards the previous data the pre-crisis economic growth accomplish around   Visegrad countries come into sight to be sustainable and look like to make enough room for immediate catching-up with the economic intensity of the old member states (Fifeková, 2013). Both the prospect of utilizing the EU financial resources and the pledge to meet the union criteria encourage dynamic pro-growth impulses. As per outlook of investors the countries were consider to be safe as required for accomplishment of the convergence criteria formed fundamentals for good return on investment (Sass and Fifekova, 2011). On the same time the development of the situation for mobility of production features made scope for better assets flows into the region. The long-standing economic development rate athwart the V4 countries in 1995 -2015 was 1.7 % points greater than the EU15 associated states (Table 1), which outcomes essentially from the above-average real GDP growth rate in Poland and Slovakia. These finding point out dissimilarity between the V4 and old member states become principally visible in the pre-crisis phase after the V4 countries´ expansion vitality increased, particularly instantly after their EU accession.

Table 1 **Long-run economic growth (in % based)**

	1995-2015	1995-2008	2009-2015
EU 27	1.55	2.2	0.67
EU15	1.45	2.1	0.61
V4	3.16	3.84	1.64
Czech Republic	2.25	3.23	0.46
Hungary	1.85	2.88	0.41
Poland	3.89	4.32	2.38
Slovakia	3.71	4.7	2.02

Source: Eurostat.

From the time after EU accession in 2004 could be alienated into two periods, before and after crisis. The financial catastrophe has affect V4 economies in various ways, but it can be fulfilled that the familiar effects of the financial crisis were (Sobják 2013)
- Prickly decline level of GDP,
- drop off in exports due to less market demand in EU market,

- Manufacturing production and the construction sector turn down,
- Capital loss from the V4 region.

The considerable drop in GDP results momentous boost in unemployment rates transversely V4 countries. The nature of V4 economies is that they are open, small (except Poland) an extremely export-oriented, it means, their experience to negative trends in overall economy is pretty high. The economy of the Slovakia is most dynamic in the European Union. It is a small and open economy which means exports plays important role in GDP. Though the furthermost power can also be the key weak point. The duration 2004 to the beginning of the crisis, GDP enlargement was along with the highest in EU, also support by tough efficiency expansion. The drop down in GDP is awaken of the crisis was one of the utmost (OECD 2013). The phase after joining the European Union is distinguish by increasing economic growth, and their dynamics has important impact on the labor market in the route of a reduce in unemployment rate and generating further stable jobs. Nevertheless, in Slovakia stay put tough regional division of labor market, income discrimination within the state and the regions. In requisites of Slovakia there was a quick boost in GDP beginning of the crisis. The GDP escalation in 2007 pointed above 10%. Evaluating the other V4 countries which bring to a close that the decrease of GDP growth in Slovakia was huge, from 10.5% in 2007 to -4.9% in 2009. Represented Figure 1, revival was pretty fast. The strong increase in previous time crisis was determined by foremost export oriented FDI inflows,

The economy of Czech Republic is a constant, small and open economy, strongly incorporated with the European Union. The country is majorly as export economy with tough equipment and automotive industry, which is closely, associated with Germany whose major export partner. Prior to the economic crisis that arise in 2008, the Czech Republic practiced the greatest period of continuous increase yet (European Commission 2014a). There was a slow healing in 2010 and 2011. Though, in the upcoming year the Czech economy knock out back into the collapse. Evaluating the other V4 countries, the Czech Republic was the only V4 country with pessimistic GDP growth in 2013. The Czech economy has remained weak from long time than the majority of EU countries. The recovery started in the second half of 2013. The reasons could be seen in a lack of outside demand and because of serious actions taken by the government (OECD 2014b).

The expansion in the Hungarian economy is pretty different. The somber slowdown of the economy could be seen since the beginning of the year 2006. Concerning GPD growth is noticeable that the crisis has strike Hungary a bit previous than the other V4 countries. In April 2006, the Hungarian government implements a package of austerity measures in order to reduce the budget scarcity.

Further GDP decline (1.7%), Hungary gone through recession in 2013, with GDP growth of 1.1%. though, feeble investment, low employability of non skillful workers and non availability labor and product markets detained back growth potential.If we will compare current situation i.e. 2017 with compare to 2013 there is not much difference with numbers which express today's situation of economic growth with reference to labor market scenario of V4 countries.

Figure 1 **GDP growth in V4 countries and EU-28 between 2004 and 2013 (in %)**
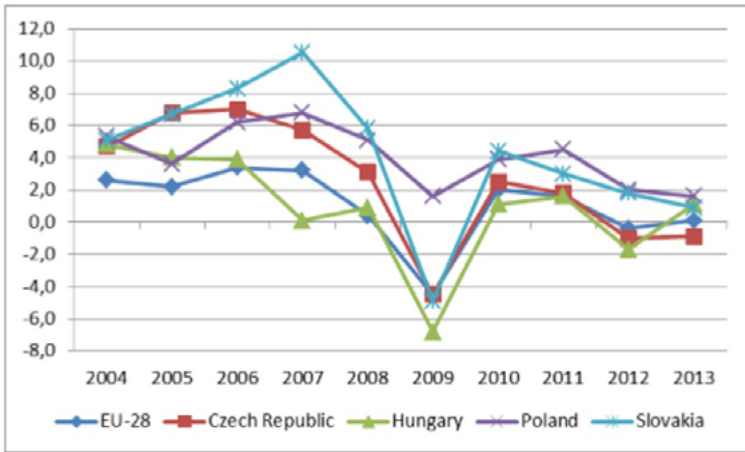
Source: Eurostat.

Note: GDP at market prices, percentage change over previous period.

With comparison to all Visegrad countries, Poland is the only country who doesn't count in negative GDP growth since joining the EU. The economic presentation has been remarkable since EU accession in 2004. The achievement of Poland in undertakes the crisis is rather notable. Various bases for positive expansion in GDP growth.

Table 2 **Countries, 1995-2011 (average annual indices in %) decomposi-
tion Analysis of Employment Growth in V4 Countries, 1995-2013**

	Employ-ment growth index	Changes in labour produc-tivity	Changes in import of inter-mediates	Changes in the structure of production	Changes in the in-dustrial fi-nal demand structure	Changes in the final demand structure by sectors	Change in the final demand volume
	(1)	(2)	(3)	(4)	(5)	(6)	
Czech Republic							
1995–2002	99.56	96.24	99.19	100.87	99.42	99.73	104.28
2003–2008	100.97	95.94	99.47	100.23	99.37	99.14	107.15
1995–2008	100.02	96.1	99.32	100.57	99.4	99.46	105.59
2009–2011*	98.73	101.10	99.20	99.54	99.78	99.82	99.30
Hungary							
1995–2002	100.69	97.32	98.65	99.78	98.65	98.97	107.67
2003–2008	99.57	96.92	99.36	100.16	99.44	98.79	105.07
1995–2008	99.79	97.15	98.95	99.94	98.99	98.89	106.54
2009–2011*	99.62	103.18	99.92	100.07	100.19	99.37	96.98
Poland							
1995–2002	99.03	95.5	99.21	99.69	99.41	99.74	105.66
2003–2008	102.27	97.37	99.67	99.64	99.28	99.52	107.05
1995–2008	100.41	96.3	99.4	99.67	99.35	99.64	106.25
2009–2011*	99.92	102.45	99.40	99.35	99.83	99.73	99.21
Slovakia							
1995–2002	99.53	95.83	99.1	99.85	98.91	100.08	106.03
2003–2008	101.59	95.91	99.48	98.85	98.69	98.48	110.84
1995–2008	100.41	95.87	99.26	99.42	98.82	99.39	108.06
2009–2011*	99.83	99.86	100.56	100.56	100.31	100.84	97.82

Note: For the years 2009-2011, the decomposition is based on data in current
prices so the results are not comparable with previous periods.
Source: World Input-Output Database, 2013.

In a standard move toward, the employment elasticity it is calculated by an
elasticity constraint (e.g. employment intensity) acquire from reverting employ-
ment development on final requirement of growth and a set of other determinants,

labor efficiency enlargement in the first place. Here we can have look on disingenuous outcome from a center on labor productivity and final demand growth by a simple computational exercise. Time when multiply the alter in labor efficiency and the transformation in the amount of final demand; we get an estimate of the potential employment growth investing the other factors fixed. We will evaluate the probable employment growth with the actual employment development. The difference expressed in percentage points is shown in Table 2.

Table 3 **Difference between Real and Potential Employment Growth in p.p.**

	Czech Republic	Hungary	Poland	Slovakia
1995-2002	0.8	4.09	1.88	2.08
2003-2008	1.83	2.26	1.96	4.72
2009-2012	1.67	0.45	1.71	-2.14

Source: European Commission, 2012a.

Scenario of all V4 countries describe higher   employment growth with any negative impact of changes in the structure of production and the structure of final demand by single exemption is the last period in Slovakia with steady effect of the structural changes. While difference in size is high. The results are noted down in above table because the economic developments are correlated with each. As well as these results spotted on the structural contribution changes to employment growth. At last analysis describe the final demand changes and fester the final demand changes into three components.

3.1   Labor market developments in V4

Labor market situation

The labor markets of Visegrad countries experienced considerable revolution afar accession to the EU. Several measures intended at put off important labor migration were steadily removed..There are tremendous developments in the labor markets from the time joining the EU can be differentiated into two periods which is explain well in below mention Figure 2 , though, differed significantly in nature (Šikulová a kol. 2014). From the beginning of the crisis in 2009 represent the separating line and it left the major negative occurrence in the Visegrads's labor markets which are very complex to conquer nowadays. Therefore, it is a critical subject to overcome with unemployment, because it corresponds to the unused value of the economy and it is a common indicator linked with unfavorable social phenomena (Pongráczová, 2011)

Figure 2 **Unemployment rate in V4 countries and EU-28 between 2004 and 2013 (in %)**
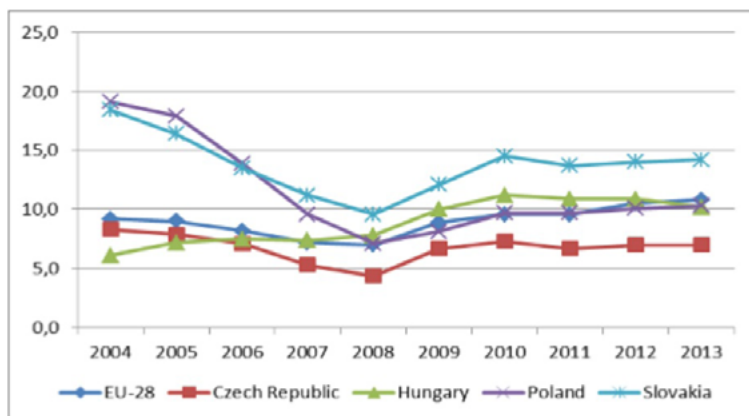
Source: Eurostat, own processing.

3.2   How employment can generate in Visegrad countries?

To generate high employment within the Viserad group of countries with continuing high unemployment and low employment rate in the EU, in April 2012 the Commission introduced a situate of actions with a understandable purpose, specifically to support job formation, permitted Employment Package. The Employment Package is a situate of credentials exactness the options to link employment policy at the EU level with a number of other policies to endorse smart, sustainable and comprehensive growth. It identifies possible areas of job formation and the nearly all efficient way to generate them within the EU. The Commission projected measures in the following areas (European Commission 2012a): a) Promote job formation; b) Re-establish the dynamics of labor markets; c) Develop the EU governance.

In the area of promoting job creation, the measures can be divided into three sub-areas which are mentioned in below Figure 3.

Figure 3 **Area of promoting job creation**
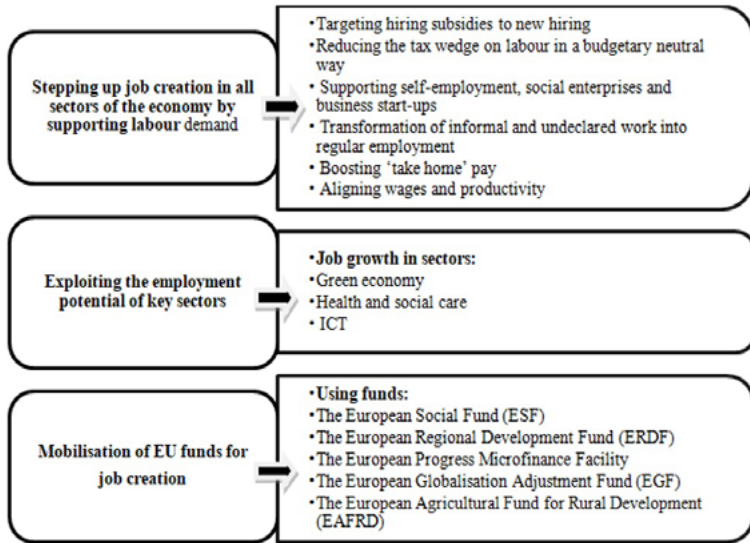
Source: European Commission, 2012a.

4   Conclusion

After EU accession we say that it was the right decision for Visegrad countries. even though the positive developments since 2004 were strike by the crisis, the circumstances are better than at the beginning in 2004. These days, the Visegrad countries are cost-effectively stronger and if work together they have also stronger voice in the EU. The employment development, low labor mobility. Elasticity and existing problems with unemployment situation in V4 countries revitalized the debate about the opportunity that economic policy might persuade the association between economic growth and employment growth In conditions of labor market, the major concern that require to resolve are: a) high unemployment rates b) long-term unemployment and to discover how to get lasting unemployed for employment but one thing is relatively exciting. Although relating high unemployment rates crosswise the EU, nearby is more than 2 million employment opportunity. now and again the only matter is geographic People are not keen to move to another city/country since of social relationships. along with further employment problem, the for the most severe issues , enduring and youth unemployment and we need to pay staid consideration for solving them. Since

the longer you are jobless, the difficult it is to get hired and the more support is needed. Even though V4 countries have some targeted dynamic labor market programm for enduring and youth unemployed, Public Services lean to use the majority of the resources for further jobless people for the reason that this lead to enhanced results for searching jobs for unemployed.

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DISCOURSE ON CORPORATE SOCIAL RESPONSIBILITY IN THE CONTEXT OF NON-PROFIT ORGANIZATION

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Abstract

The aim of this article is to make an initial assessment of the basic areas of activity of one selected NGO with respect to compliance with these requirements, on the basis of which an attempt to attain the PN-ISO 26000 standard can be taken. There are various motives that encourage companies to implement the concept of Corporate Social Responsibility (CSR). Despite the obvious benefits of CSR, barriers to implementing sustainable business principles are prevalent. To present one implementation of the principles of responsible business, this article refers to the example of the Fundacja Wspólnota Nadziei foundation (Community of Hope Foundation), representing the non-profit sector. The Foundation and the Farm of Life, which represents it, meet the requirements applying to a socially responsible business. Therefore, it should strive to obtain the PN-ISO 26000 standard. This will help the Foundation strengthen its position and thus increase its credibility in social and business contacts.

Keywords: *Corporate Social Responsibility (CSR), non-profit organization, firm behaviour*

JEL classification: *L31, M14, D21*

1 Introduction

The history of Corporate Social Responsibility (CSR) goes back to the end of the 19th century. Initially, it emerged in the United States, and was very popular during the Great Depression. Entrepreneurs were then looking for a way to help them to regain social trust. Decades later, Bowen [1953] wrote about ethics in business.

He emphasised that one should run a business in which attention is also paid to the good of the society. The principles referring to philanthropy were the first concepts of corporate social responsibility. [Brammer and Millington, 2005, p. 29-44; Carroll, 2000, p. 33-42; Szczepańska, 2011, p. 171] Today, when globalisation is causing greater environmental threats, while the free movement of goods and services and their scope make it difficult to maintain honest business practices, CSR has become particularly important. [Galbreath, 2010, p. 511-525; Weber, 2008, p. 247-261; Whitehouse, 2006, p. 279-296]

The set of standards that refer to CSR includes the PN-ISO 26000 standard, which was developed by the International Organisation for Standardisation, ISO, in 2010. This standard is a guide for an organisation with respect to the application of the principles of social and environmental responsibility. It is a group of practices and standards that can be applied voluntarily by an organisation. This standard is not subject to certification and any organisation, whether business, government and local government administration, or the third sector, can use it – provided they follow the principles of PN-ISO 26000. [http://odpowiedzialnybiznes.pl]

The aim of this article is to present the issue of Corporate Social Responsibility, especially concerning the non-profit organization on the basis of selected foundation.

2 Conceptual framework

2.1 Corporate Social Responsibility (CSR)

Many efforts have been made to define CSR in the literature. According to Griffin [1999, p. 144], social responsibility is "a set of commitments to protecting and strengthening the society in which it operates". As cited in Borkowska [2005, p. 90] "the idea of social responsibility is to achieve its own goals, while paying attention to the good of its stakeholders." More on the essence of CSR has been offered by Kazojć [2014, p. 60], who describes it as "a long-term and dynamic concept of building social trust through analysis and meeting the identified and unidentified needs of stakeholders, which would allow, on the one hand, achievement of objectives of the organisation's strategy and, on the other, solve social and environmental problems." An important aspect of CSR is care for the needs of the environment and societies perceived on a macro scale, in relation to the activities of large enterprises and corporations. [Balabanis, Phillips and Lyall, 1998; Carroll, 1979; Dahl, 1972; Hetherington, 1973]

Summing up, CSR is "the responsibility of enterprises for their impacts on society". [Communication from the Commission to the European Parliament, 2011, p. 6]. Education in business schools aimed at shaping the right attitude of entrepreneurs is also important. [Matten and Moon, 2004, p. 323-337]

The CSR concept distinguishes areas that Kazojć [2014, p. 63-64], referring to Griffin, has divided into: 1. overall social well-being, which consists in increasing the level of well-being in the local environment through additional enterprise activity; 2. external participants, who are also referred to as stakeholders (including employees, investors, and clients); in this approach, CSR means care and attention to business and the needs of employees, the credibility of the information provided, as well as activities aimed at satisfying social needs; 3. the natural environment, i.e. an area in which, as emphasised by Wojciechowski [2009, p. 322] and Rojek-Nowosielska [2010, p. 217], the company should care for the natural environment at every stage of its production and conduct rational waste management as part of sustainable development.

In the area of the personnel policy of a company, CSR refers to creating optimal conditions for the employees. This translates into an increase in their motivation and greater work efficiency, which is connected with the recovery of expenditures that the company incurs with respect to employee-related activities. [Zieliński, p. 661] "At present, the low costs of operation, production, high quality of products or service are no longer enough to gain advantage on the market." [Kazojć, 2014, p. 58]. Companies are looking for other areas in which they could compete with one another. Market success is achieved by companies that care for both people and for the environment. [Piskalski, 2015, p. 8]

There are various motives that encourage companies to implement the concept of CSR. These include, among others, the pressure of the environment, trends, the strategy of maximising the economic benefits of the enterprise, moral considerations, and caring for the environment. With respect to these aspects, the following types of CSR can be distinguished: 1. ethical – damages that a company can cause by conducting its activity; 2. strategic – business goals realised through social goals; 3. altruistic – the operation of the company associated with carrying a kind of loss. [Rogowski, 2016, pp. 38-40]

According to Przybyłowski and Bachnik [2011, p.196], enterprises which implement a CSR strategy do so because they can recognise and respond to the needs of the environment (both regarding obtaining information about the needs of the local environment, as well as restoration of the original condition of the environment, which was destroyed by the company's production activities). In general, contemporary trends in corporate social responsibility concentrate on: 1. respect for human rights and business conduct, which are a challenge for enterprises and

countries in which these enterprises operate; 2. issues of social needs; 3. the environmental dimension, especially natural resources and using them sparingly; 4. developing a socially responsible business, i.e. managing supply chains. [Brojak-Trzaskowska, 2014, pp. 154-155]

Of late, one can come across of the evolutionary change of CSR into CSR 2.0, namely defining the concept on a macro scale. Thus, business responsibility not only affects the local environment, but should also have a global impact. [Buczkowski et al., 2016, p. 16]

2.2 Barriers to introducing principles compliant with Corporate Social Responsibility (CSR)

Despite the obvious benefits of CSR, barriers to implementing sustainable business principles are prevalent. Carroll [1991] created a pyramid of social responsibility that resembles the pyramid of Maslow's hierarchy of needs. The pyramid is divided into four parts: economic responsibility, legal responsibility, ethical responsibility, and philanthropic responsibility. It is worth emphasising that at the base of this pyramid lies economic responsibility. Kazojć notes that this is the foundation of any actions in corporate social responsibility. In her view, it is impossible for a company to stay on the market while generating loss. Consequently, such a company is not able to provide stable conditions for employees. If a company cannot take care of employees, it will not pay attention to the natural environment or support public benefit institutions either [Kazojć, 2014, pp. 65-66]. Codogni is of similar opinion [2012, p. 288] when addressing the economic issue as follows: "in the face of an existential threat to a business organisation, ethical issues recede into the background." A company that has economic problems puts the environment and community needs on the backburner.

There are many barriers that prevent enterprises in Poland from implementing CSR-related activities. Codogni [2012, pp. 287-288] attempted to identify them. In her view, the problem begins at the stage of definition of the concept. Moreover, she mentions that theories that would suggest the responsibility of business owners for social issues have long been overlooked in economic sciences. The activities of Polish entrepreneurs are mainly focused on making profits. An additional aspect hindering the implementation of CSR principles is the dependence of the company on the links between the economy and policy as well as the limited knowledge of managers about CSR principles and the possibilities for its application in business.

3   Methodology

To present one implementation of the principles of responsible business (CSF), this article refers to the example of the Fundacja Wspólnota Nadziei foundation (Community of Hope Foundation), representing the non-profit sector, and in particular to one of its units – the Centrum Nauki i Życia "Farma" (the "Farma" Learning and Life Centre). Its activity has been analysed according to the areas of impact on the surrounding environment of the organisation implementing the principles of socially responsible business.

The research method employed in the work is a case study along with interviews held with Foundation staff.

The aim of research is to make an initial assessment of the basic areas of activity of one selected NGO with respect to compliance with these requirements, on the basis of which an attempt to attain the PN-ISO 26000 standard can be taken.

4   Results

The Fundacja Wspólnota Nadziei was established in 1998 with the mission to create a support system for people with autism and related developmental disorders, as well as for their families. The Foundation is a signatory of the Małopolska Pact for Social Economy. For years, it has been collaborating with AIESEC (initially, the name was an acronym, now it is a proper name) – an international student organisation offering free-of-charge volunteer internships from around the world. The group of volunteers who cooperate with the Foundation on a regular basis are students from nearby schools, firefighters from the volunteer fire brigade, scouts, etc.

The Fundacja Wspólnota Nadziei implements various projects, e.g. "Support for employment of adults with autism", with the help of the European Social Fund. This project contributes not only to developing the competence of people with autism. Preparing this group for work requires cooperation with business, which helps in creating a positive image of both the Foundation and of the non-profit organisation and business entities. As part of counselling and vocational training, as well as through "job coaching" and internships, the social and professional exclusion of the group of beneficiaries, who require permanent support, is prevented. The organisational units of the Fundacja Wspólnota Nadziei are: 1. Centrum Nauki i Życia "Farma" (the "Farma" Learning and Life Centre; 2. the "Dom w Połowie Drogi" hostel; 3. Niepubliczny Zakład Opieki Zdrowotnej "Autyzm" ("Autyzm" Non-public Health Care Centre).

As has already been mentioned, the authors of this article focused on the activities of one of the units of the Fundacja Wspólnota Nadziei, namely the the

"Farma" Learning and Life Centre. The "Farma Życia" ("Farm of Life") is located in Więckowice, near Kraków. It is the first specialist centre in Poland combining residential, therapeutic, educational and recreational functions. The farm is home to permanent residents, and at the same time, it offers many activities to autistic people commuting there to classes and workshops. The Centre conducts social and professional activation programmes and implements projects in cooperation with various organisations and institutions, both locally and on the regional, national, and international level. The idea behind creating the Farm of Life resulted from inspiring examples of rural communities for people with autism. Such communities have been operating in Western Europe and the United States for many years. In particular, the creation of the Farm of Life was based on the solutions of the Irish Society of Autism – the Dunfirth Farm, which is located in the Dublin area and enjoys international renown. The owners of the Dunfirth Farm, have been supporting the Farm of Life in Więckowice with their experience and advice since its inception.

There are two buildings on the Farm out of the five that are planned. This requires a huge commitment of work and financial resources. The Foundation uses the support of volunteers, national and EU funds, as well as donations from foundations, companies, and private individuals. At present, there are 10 permanent residents living on the Farm who require round-the-clock care. Ultimately, it is planned that 35 residents will live on the Farm, which by no means satisfies the needs for such services in Kraków and its surroundings. There are many workshops organised at the Farm: educational, art, tailoring, computer-office skills, gardening, carpentry, ceramics, and laundry. There is also a rehabilitation room, office space for Foundation employees and guest rooms for volunteers. A major achievement was the development of an Internet platform for people with autism.

The Farm of Life is located on a picturesque 7 ha site, on the outskirts of the Jurassic Landscape Park. On the Farm, biodynamic farming of vegetables and fruit has been established. In 2008, the Farm of Life obtained certification as an organic farm. There are plans to introduce, on a small scale, animal breeding, of for instance Hucul Ponies, green legged chickens, and rabbits. It is an environmentally friendly centre. Since 2014, the Farm has partially switched to solar power thanks to its victory in the "Free your energy!" competition, announced by Greenpeace Polska, which funded photovoltaic panels.

The farm also features a tobogganing hill, bicycle path, as well as a health path created with the support of Kraków Airport as part of the "We Support Our Neighbours" competition. There is an Outdoor Recreation Centre on the Farm as well.

Based on interviews conducted with employees of the Farm of Life, the activity of this institution was assessed in terms of compliance with the requirements of the PN-ISO 26000 standard.

Organisational order

The Farm of Life cooperates with local governments (mainly the Zabierzów commune), schools, non-governmental organisations, and companies. Two forms of work for its benefit are practiced at the Farm: the charitable activities of volunteers and paid work of qualified personnel. The rules of work and the organisational structure are transparent. Similarly, the income of the Farm comes from various types of funds, gifts, and tax deductions.

Human rights

The mission of the Fundacja Wspólnota Nadziei includes respect for the human rights of persons with intellectual dysfunctions. Both in its statute, as well as in its campaigns and promotional and marketing materials, the Foundation refers to two legal acts: the Declaration of Rights of Persons with Autism, adopted by the European Parliament on 9 May 1996, and the Charter of Rights of Persons with Autism adopted at the 4th International Congress of Autism-Europe in The Hague on 12 May 1992, signed and approved by the European Parliament on 9 May 1996.

Work experience and fair operating practices

The Fundacja Wspólnota Nadziei, as a public benefit organisation, conducts transparent activities. It very much cares for its reputation as a place where the work of people with disabilities is primarily a form of their therapy. The currently very small income earned from the sale of fruit, vegetables, preserves, and handicrafts is a form of moral payment for the work performed and a motivation to take further actions as part of rehabilitation efforts and social inclusion. The running costs of the Foundation's operation are covered mainly by the families of the Farm's residents and by other beneficiaries. To a lesser degree, funds are obtained from external sources.

Environment

In the case of the Foundation in question, the natural environment is very important, depending on the needs of the beneficiaries, as well as on the actions taken to facilitate the sustainable management of resources. First of all, contact with nature is crucial for the physical and mental health of the beneficiaries of the Centre; it offers a certain degree of freedom in rehabilitation. Beneficiaries also participate in light field work and gardening. Ecological farming is used to:

1. raise the ecological awareness of the inhabitants of the Farm of Life, groups of people with autism using various forms of education and therapy, volunteers, and the local community; 2. produce high-quality food and use it for consumption; 3. sell these products.

Consumer services

It is planned that a Social Cooperative will be established. It will focus on the production of fruit and vegetables and their sale in organic food shops or via direct sales. Taking up such a development path by the Foundation will require preparation and development of a series of procedures guaranteeing compliance with all standards in the scope of production, processing, and sale of goods.

Social engagement and involvement in the development of local community

Since 2014, picnics have been organised which the local community participates in. Local entrepreneurs are invited to take part in these events. Moreover, the Foundation cooperates with schools and local government. Infrastructure (a gym) is available, which may be used by local residents (although they are rather reluctant to do so). The Foundation has also marked its presence in culture. Autistic people, in cooperation with theatre professionals, participated in the performance of the play *Paradiso* based on *The Divine Comedy* by Dante. The premiere took place on 22 June 2014 in the Łaźnia Nowa theatre. It had been preceded by theatrical workshops which prepared the participants to become actors. The performance was very well received and had very good reviews. The newspaper *Dziennik Polski* named it one of the ten most interesting performances of 2014.

5   Discussion

Rogowski [2016, p. 46] conducted research that would boost the knowledge of how the implementation of the concept of corporate social responsibility is progressing in Polish enterprises. It was based on the experience of consultants. As the researcher pointed out, due to the low response rate, the conclusions from the research should be treated as preliminary and further research in this area is necessary. In the summary, he stressed that the basic reason why companies implement CSR in Poland is the potential economic and financial benefits and,in 50% of the cases examined, the improvement of company image. However, according to 26% of the responses, CSR is a passing trend.

Other aspects of CSR can be observed in a report developed by Piskalski [2015, p. 10]. The main part of the research was the analysis of available content published on the websites of companies. The issues subject to analysis included, among others, offering contact to company officers responsible for CSR matters, following a CSR policy by

a company, and sharing reports on the non-financial activities of an enterprise. For the researchers, "the key issue was publishing materials in Polish, which guarantees the widest possible access to information for native stakeholders". [Piskalski, 2015, p. 10] The author emphasises that social responsibility does not include charity and philanthropy – it is necessary to clearly separate responsibility at the business model level from sponsorship. The raw materials, fuels, and energy sector is the most transparent in terms of conducting socially responsible business. The financial, media, and communication industry also achieved good results. The least favourable indicators were demonstrated by Special Economic Zones and public utility services. The report highlights a certain problem: companies define CSR very freely, depending on the needs of a given entity. There, CSR is used only as a marketing and public relations tool.

Other research on the awareness of corporate social responsibility were conducted among 25 employees of the Faculty of Information Technology and Communication at the University of Economics in Katowice. The author of this study, Losa-Jonczyk [2014], refers to the answers of the respondents who understand social responsibility of an organisation as, among other things, the application of moral and ethical principles, cooperation with the environment, or pursuing goals that are not only connected with profit. According to the respondents, CSR can be defined as the responsibility of all who work in a company and acting in accordance with the law. The respondents see social responsibility as an element used to manage a company. Among the less frequent opinions, there was a definition that social responsibility was caring for a team one supervises or supporting the development of employees. Losa-Jonczyk [2014, p. 150] states that "the idea of social responsibility is generally known to faculty representatives. However, the responses that mentioned protecting one's good image or compliance with legal norms testify to imperfect knowledge on the subject." She also adds that the least important issue, according to the respondents, was that of environmental protection. Among the most frequently mentioned benefits achieved through the implementation of activities related to social responsibility, there were, among others: "improving the image, (...) increasing the number of students, building a brand, competitiveness on the educational market." [Losa-Jonczyk, 2014, p. 153]

Leoński [2015, p. 95], on the other hand, when referring to the data of the Polish Agency for Enterprise Development, concludes that, to a large extent, the knowledge of the concept of CSR depends on the size of the enterprise.

6   Conclusions

Corporate Social Responsibility operates in the field of social economy. The profits achieved through conducting socially responsible business by companies and organisations are multifaceted. Those with a measurable character relate to economic benefits. The parties that record the greatest gains are primarily the environment and the company itself, which – by declaring a sustainable activity – builds its brand on the market and strengthens business relations and social (public) relations. But there are also some dangers resulting from ensuring compliance with imposed standards. Lack of diligence in the implementation of the pro-social and pro-environmental policy adopted by companies and organisations may lead to "losing face" and their hard-won market position. In particular, organisations that represent the third sector must remember that by operating in the area of social problems and by using the support of public institutions, subsidies, and gifts, they are subject to continuous evaluation by the public.

The Fundacja Wspólnota Nadziei and the Farm of Life, which represents it, meet the requirements applying to a socially responsible business. Therefore, it should strive to obtain the PN-ISO 26000 standard. This will help the Foundation strengthen its position and thus increase its credibility in social and business contacts. However, the analysis of the Foundation's activity carried out by the author indicates that it is necessary to mention some points that require particular caution. The first is the local community. It is important to ensure closer contacts between the Foundation and the local community. Working with the local environment must be a continuous process. According to the interviews, the early stages of the Foundation's activity were met with a certain reluctance among the residents due to the peculiar behaviour of the permanent residents of the Farm – autistic people with a deep intellectual disability. The Foundation plans further development, i.e. more houses, more residents at the Farm of Life, and the creation of a Social Cooperative dealing with the production and processing of vegetables and fruits. The purchase of animals is also planned. If all these activities are to bring the expected results, they must correspond with the place and people. This means that the Farm, which is part of the commune, should consider both its own interests and the expectations and needs of the local community. The second, sensitive, aspect is the planned extension of the Foundation's activities to include business functions. When this happens, it will be necessary to ensure full transparency of this activity and the fulfilment of all requirements applying to labour and its scope, in addition to fulfilling all organisational and legal requirements regarding the employment and performance of labour by people with intellectual disabilities. These are, of course, standard requirements that the management and

leaders of such foundations are fully aware of. However, whenever public means are managed and at the same time a business activity is conducted, special care must be taken.

The establishment of a CSR strategy concerning NGOs has become more importance. The strategy can be a crucial component of its own policy. The activities suggested by the authors can be also used by other non-profit organization.

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CURRENT TRENDS IN FAMILY BUSINESS IN SLOVAKIA AND EUROPE

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Abstract

The submitted scientific paper deals with the characteristics of the family business, its types and legal forms of family business. We determined roles in family business and described them through a three-circle model. We also describe the individual advantages and disadvantages of the family business and also ways to eliminate the disadvantages and conflicts arising in this type of business. The research that we came out was implemented by company KPMG Slovensko spol. s r.o. The research was attended by 1,122 respondents from 26 European countries. Further, we drew attention to current trends in family business in Europe, including the Slovak Republic and current trends in Slovak family businesses too. At the end, we summarized the seven key pillars of the success of the family business.

Keywords: *Entrepreneurship, Family Business, Family Firm*

JEL classification: *F23, M29*

1   Introduction

The aim of this paper is to highlight the current trends in family business in Slovakia and in Europe. However, we need to pay attention to the definition of a family business, to its forms and to the advantages and disadvantages of the family business.

1.1 Characteristic of family business and its forms

Family business can be defined as an enterprise that fulfills at least one of the following criteria: (Strážovská 2008, pg. 10)

- the owner considers his business as a family business,
- the owner intends to transfer his business to a close relative,
- in addition to the owner, another member of the family, family members who are part of the day-to-day management process of the business.

Poza and Daugherty create theoretical definition of a family business, that focuses on the vision, intentions, and behaviors, vis-à-vis strategy, management, succession, and continuity of the owners´ control. Ownership structure aside, what differentiates family businesses from management-controlled businesses are often the intentions, values, and strategy-influencing interactions of owners who are members of the same family. The result is a unique blending of family, management, and ownership subsystems to form an idiosyncratic family-business system. This family-management-ownership interaction can produce significant adaptive capacity and competitive advantage. Or it can be the source of significant vulnerability in the face of generational or competitive change. (Poza & Daugherty 2014, pg. 6)

Based on experience from practice, three types of family businesses can be distinguished: (Markovičová 2014)

- parental family business – where one parent occupies the dominant position of the owner and the boss at the same time. Father is the most common on this position.
- the family business of a married couple – joint family business is created by a married couple. In this type there are several relationships between the partners:
- both partners have an equal position in the enterprise
- one of the partners manages the enterprise and the other provides additional service
- one of the partners join the enterprise for economic reasons - cost reduction.
- family business of relatives – in the business works siblings, married partner or other relatives.

Legislation in the Slovak Republic does not define a family business. The term "business" is defined in the Slovak Republic in the Commercial Code and the

Trades Licensing Act. These two legal norms regulate the basic legal conditions of business of natural and legal persons in the Slovak Republic.

The family business is distinguished from "non-family" business by the fact that the closest family members are in the family business in the position of the owners, co-owners, first associate or assisting persons. In setting up, establishing and operating have family businesses the same business conditions as for other business entities. (Markovičová 2014)

There are two specific forms of family business in the Slovak Republic: (Strážovská 2008, str. 12)

- an individual enterprise of a natural person – it is a business of a natural person registered or not registered in the business register. Besides the entrepreneur = the owner of the enterprise, also there work other members of the family, or strangers can work there too. In practice it is a self-employed person.
- a family business company – it is a company based on family members and it is governed by the provisions of the Commercial Code. In practice, is the most common Limited company.

1.2 The roles of family business

The three-circle model of family business was originally introduced by Hoy and Verser in 1994. This model has received wide acceptance in practice. It identifies seven types of roles that an individual can play in a family business system. It is displayed in Figure 1.

Figure 1 **The three-circle model of family business**
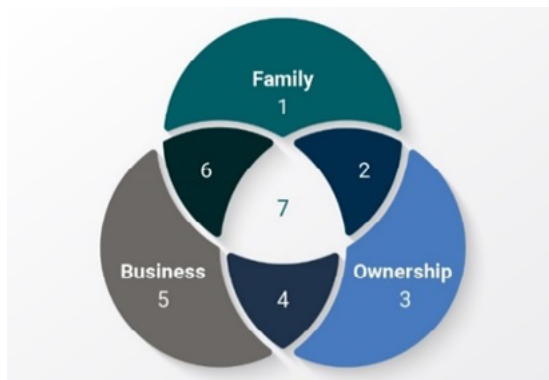
Source: Zellweger 2017, own processing.

Roles and their motives in the three-circle model are following: (Zellweger 2017, pg. 17-18)

1. Family members who are neither shareholders nor business managers – motives: harmony, mutual support, long-term survival of the firm
2. Family members who hold shares but are not involved in management – motives: return on equity dividends, information access
3. Shareholders who are neither family members nor managers – motives: return on equity, dividends, value of the ownership stake
4. Nonfamily members holding shares – motives: opportunity to benefit from firm performance and increase in value, managerial discretion
5. Employees or managers who are neither family members nor shareholders – motives: job security, salary, stimulating work environment, promotion opportunities, opportunity to become owner
6. Family members involved in operations without shares – motives: get to know the firm, career path inside the firm, ways to eventually become owner
7. Family managers holding shares – motives: trying to be successful in all three systems: family (togetherness), business (commercial and entrepreneurial success), ownership (financial success)

1.3 The advantages and disadvantages of family business

The advantages of family business: (Markovičová 2014)

- a family business provides fulfillment of family members life dreams and wider possibilities for self-realization,
- the ability to build a long-term stable business for next generation of followers, to build a tradition in business,
- a family business provides more work motivation because a person works for himself,
- cohesiveness and mutual substitutability of family members, trust, co-responsibility,
- taking advantage of generational differences – the wisdom and knowledge of the older generation and the energy of the younger generation
- economic factors - cost savings
- there is no such strong psychological pressure from the employer because the employer is a family.

The disadvantages of family business: (Markovičová 2014)

- business is time-consuming. Working time is never-ending. Disappears the difference between private and working life.
- job conflicts are transferred to the private life,

- failure in business can cause a failure in family relationships,
- family members tend to "override" over other employees of the company and tend to have more competency than other employees,
- family members are often favored in assessing work, filling of jobs and remuneration, which is sensitively received by other employees,
- there may be disputes and unhealthy rivalry between family members,
- there are conflicts between business interests and family interests.

To eliminate the disadvantages and potential conflicts, it is necessary: (Markovičová 2014)

- to clearly define the competencies, duties, and responsibilities of individual members of the family in the company,
- to closely objectively evaluate the abilities of the family members and according to this place them in the working place,
- to remunerate them as other employees.
- at the start of the business, you need to arrange "game rules" and follow them,
- the founder of a family business must determine his "successor" and think in detail when and how to hand over to him a family business.
- it is recommended to make the greatest effort to separate work and family.

2 Data and Methods

2.1 The research

The research was realized by company KPMG Slovensko spol.s r.o. and it is called European family business barometer. The results of the research are based on 1,122 respondents from family businesses in 26 European countries, including Slovakia. The survey was conducted in the form of an online questionnaire in the months of May - August 2017. It records the current trends among European family businesses.

2.2 Respondents´ profiles

Regarding ownership, in 45% is 1st generation currently managing the business, in 40% it´s 2nd or 3rd generation and only in 11% it is 4th generation. Regarding governance, in 40% is 1st generation currently managing the family business, in 42% it is 2nd and 3rd generation and same 11% it is 4th generation. Most respondents (45%) has been operating with family ownership between 20 and 50 years. 34% respondents have been operating with family ownership for over 50 years and 19% respondents for less than 20 years. 39% of respondent employ less than 50

people for full-time, 32% employ between 50 and 249 employees, 16% respondents employ between 250 and 1000 employees and 11% employees over 1000 people. Approximate annual turnover of the business is in 40% less than 10mln. €, in 25% between 10mln. € and 50mln. €, in 17% between 50mln. € and 200mln. € and in 12% it is more than 200mln. €.

3   Results and Discussion

3.1   Current trends in family business in Europe (including Slovakia)

From research carried out, we found that in the following 12 months the respondents had the following plan: 22% want to leave the management of the business to the next generation, 13% want to leave the governance (ultimate control) of the business to the next generation, 13% want to leave the ownership of the business to the next generation, 10% want to appoint a non-family CEO retaining ownership/control within the family, 6% want to sell off the business to a third party, 2% want to sell off the business to current employees, 1% want to sell of the business to another family member and 1% want initial public offering.

European family businesses consider preparing and training a successor before leadership succession in 60% very important, in 25% important, in 8% not important, in 3% not important at all and in 4% no answer was given. In general, successful family businesses are investing an increasing level of resources, time and energy into building their leadership from within the family to ensure the long-term continuity of the business. More than 50% of respondents indicated that they have a member of the next generation in management roles within the company which will allow them to prepare for succession planning. However, clarity around ownership is another critical issue. Agreements need to clearly define who is entitled to be an owner or shareholder. Family business owners must consider the role of non-bloodline family members such as adopted children or spouses.

Family business priorities for the next 2 years in European family businesses are: in 64% to improve profitability, in 45% to increase turnover, in 37% to become more innovative, in 32% to attract new talent, in 28% to diversify into new products or services, in 27% to move or export into new markets and in 23% educate and train new staff. We can conclude, that business decisions of European family businesses are focused on sustaining benefits for generations of family members.

Major worries of European family businesses for today are: in 43% war for talent/recruiting skilled staff, in 37% increased competition, in 36% declining

profitability, in 32% increased cost of labour, in 30% political uncertainties, in 28% changes in regulation, in 17% declining turnover, in 16% unstable currency, in 10% increased tax rates, in 7% limited access to finance, in 6% rising energy costs and in 8% something other. Because of unemployment is dropping in the EU, family businesses are beginning to find it more difficult to attract the talent they need. Although family businesses are fortunate in their ability to retain talent, they are now finding themselves in the position of having to fight to attract a workforce with the skills they require. In an effort to improve recruitment efforts, family businesses are increasingly focused on building and communicating their unique value proposition and they also offer loyalty, long-term investment, commitment, higher retention rates to employees and longer employee tenures than other businesses.

European family businesses have the following mechanisms and practices in place: formal board of directors (70%), shareholders agreement (45%), family council (33%), a family constitution or code of conduct (32%), a policy for selection remuneration and promotion of non-family management (31%), succession for other senior positions (23%), succession plans for the CEO (22%), estate plans for family members who have a stake in the business (16%), a policy for selection, remuneration and promotion of family employees (15%) and processing for welcoming, educating and inducting family members into the family business (9%).

3.2   Current trends in family business in Slovakia

Up to 86% of Slovak family businesses participating in research believe that the next 12 months will bring positive news for the company. Nearly half of respondents said they had increased their turnover over the past year and these funds plan to invest back into their business. The most asked respondents (40%) plan to invest in infrastructure, manufacturing and marketing, more than a quarter of companies invest in recruiting new employees and education.

More than eight out of ten Slovak family businesses in 2017 have increased or maintained employment. A very positive trend was also observed in the business activities of Slovak family companies abroad.

At the top of the list of major worries was war for talent. Slovak family businesses have fear of being able to attract and retain enough talented and qualified professionals. More than half of Slovak family business representatives have also identified problematic increases in labour costs.

As a major business priority for the next two years, nearly two-thirds of Slovak respondents have improved their profitability. On the second and third place was placed an increase in turnover and innovation. Fourth, the issue of

the indispensable need to attract talented employees was included. On the fourth place has placed the issue of the need to attract talented employees.

The factors that inhibit the growth of Slovak family businesses are high levy rates, administrative burdens and labour market regulation. 70% of respondents would appreciate a tax advantage in transferring ownership to direct family members.

Current survey results show that the next generation of family businesses in Slovakia has already been given the opportunity to show what they can do. The successor generation is currently in managerial positions in more than three quarters (79%) of family businesses. The founding generation is in the ownership structure of around 80% Slovakian family businesses and shifting ownership to the next generation is preparing only 11% of the respondents during next year. More than half (57%) of respondents already have a selected successor of the owner who is currently working in the company, either full-time or in the form of a brigade.

4 Conclusion

From the realized researched, we can summarize factors, that makes family businesses in Slovakia and also in Europe successful. Every company is unique. What makes one company successful does not have to guarantee success for the other company. However, KPMG Enterprise identified in general seven key pillars of success in family business:

- succession and following generations – the transition of the family business to the next generation is a challenge because less than half of family businesses will survive the transition from one generation to the next.
- business management - managing a family business requires setting family and business goals in time.
- growth - a long-term growth and profitability is the basic component of sustained success in business.
- risk management – family business can create opportunities also by managing internal and external risks. Establishing controls, finding new sources of funding, as well as effective tax management, and optimization can positively affect business profitability.
- exit strategy - in some cases, when there is no successor generation of family members ready, willing or able to continue in family business, it is rather necessary to have an exit strategy as a succession plan.
- preserving wealth - money is undoubtedly the most common cause of conflict in family businesses. It is often the case that many of the members of the fa-

mily, especially the following generation, misunderstand the long-term view of preserving wealth. It is for this reason that this element of family business requires careful planning. Family members need to learn how to handle their responsibilities, to resist the emotional impact of wealth, and to prepare themselves to protect the property of their own business.

- charity – it is an important element in the management of wealth, which consists of charitable goals and the transfer of wealth through the charitable donation.

The magazine Forbes created the chart of Top 20 Slovak Family Businesses in June 2017. There are companies like Niké, Matador Group, 101 Drogerie, CBA Slovakia, Ryba Žilina, Minit Slovakia, Mäspoma and others. This companies show us, that even a family business can be successful.

Acknowledgements

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TRENDS IN WORK WITH HUMAN RESOURCES IN SLOVAK AGRICULTURAL ENTERPRISES

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Abstract

Human capital is becoming a crucial and more valuable factor in contemporary society. Management success depends on human resources and their continual and systematic development. It is the role of managers to understand and decide which management tools have the greatest impact on employee engagement and personal development. The aim of the paper is to introduce our findings from surveys in 185 agricultural enterprises in Slovakia. In this paper, we specifically deal with two topics. The first focuses on management tools that top managers in agribusiness apply to work with human resources as part of their active participation in business decision-making. As we found out, proper application of the right management tool or method (teamwork, teambuilding activities, corporate culture and others) can help to increase employee engagement. The benefit is the possibility of improving the retention of workforce, reducing the turnover (fluctuation) costs and the necessary training with a positive impact on the overall performance of the enterprise. The second topic deals with the forms of education as a means of human resources development in a particular agricultural enterprise. The managers who participated in the survey support their staff development through different forms of education. According to the results of the survey, the participation in educational programs outside enterprise is a priority as well as the participation in exhibitions and excursions. Training within the organization is not used in 90per cent of the surveyed enterprises, which turns out to be a weakness. Skilled and interested individuals can be excellent trainers for their colleagues. By following this trend in business, agricultural enterprises could get a comparative advantage.

Keywords: *agricultural enterprises, development, education, human resources, management tools, team work, trends*

JEL classification: *M12, M14*

1   Introduction

National human capital of the country is a major factor in economic growth and the basis for competitiveness of countries in the global economy (Krajňáková, 2014). Nowadays, nobody doubts that success of every company on the global market depends on how fast the company can adjust to quick changes of the business environment. This is also one of the reasons why human capital is becoming a crucial and more valuable factor. Currently, during the era of globalization, the changes are extremely fast; therefore, it is necessary that companies reassess the instruments and procedures that have been used so far. A proper way is to activate the whole system, think about the organizational development and thus acquire a system that would be suitable for rapid changes in business (Antošová, 2010). Human resources must be regarded as "the totality of physical and intellectual properties a person uses in production and services needed for survival" (source?). Human resources are the only production factor capable of creating new values, the creator and stimulator of production means (Petruţa & Boer J. 2014). Recent research indicates that intellectual assets and resources can be utilised much more efficiently and effectively if organisations apply knowledge management techniques for leveraging their human resources and enhancing their personnel management. Human resources departments are well positioned to ensure the success of knowledge management programs, which are directed at capturing, using and re-using employees' knowledge. Through the management of human resources a culture that encourages the free flow of knowledge for meeting organisational goals can be created (Soliman & Spooner, 2000). The preparation of professional managers is an important step in business activities because as the situation in business constantly changes, company managers have to be retrained as well. The education of managers involves university preparation as well as a well-organized retraining system (Jackson et all, 2017).

According to the research made by Dubravská & Solanková (2015) companies apply the concept of the talent control and take care of the talent as they are interested in the employee development. Companies cooperate with secondary schools; they organize internships for students and work with universities in organizing lectures. In hiring, they focus on candidates with a potential that can be developed. Annually, a job evaluation in the form of interviews focused on further

development is performed. An annual training calendar is planned. Also, there is a management review evaluating managerial potential and succession building (Šajbidorová et all, 2016). Companies change their system regularly. They train the employees within the company but also offer training courses outside of it. They try to keep up with the current market. Companies advance their strength by a system of professional tests that are set for individual positions. Companies respond to the changes in human resources management and they work on the improvement of the set processes. Human resources have been the engine power of economic development with increasing? and effective of sources allocated to education. Producing innovation and patents during the last quarter, human resources have become inevitable for enterprises. The precondition for the management success lies in paying importance to human resources and developments of executives in public and private sectors, and encouragement of entrepreneurship, innovation, and patent producing human resources (Bircana & Gençlerb, 2015).

Huffman (2001) sees systematic training of human resources in agricultural enterprises as a great necessity.The question of quality and value of human resource has been prominent in Hungarian agriculture for the past few years (Nótáriet all, 2013).

It is important to identify the attitudes of employees in order to ascertain the correctness of procedures and activities in the subsystem (Finnegan, 2012). One of the options is Employee Engagement Survey. Employee engagement research investigates whether employees are fully involved and enthusiastic about their work and the company they work in. Reasonably and emotionally committed employees help create a happy atmosphere, more loyal customers and improved business results. The method measures the degree of commitment of employees to their work, colleagues and organization, helping to determine their willingness to go beyond the basic parameters of their job responsibilities. It can also be used to identify factors that have the greatest impact on employee engagement and dedication, and predicting employee sustainability. The survey helps the business identify and build on the strengths and talents of human resources to gain a competitive advantage. Surveys made by Macey et all (2009) are useful and support the development of productive, satisfied and motivated employees by creating a sense of a common goal, autonomy, as well as strong cohesion with society and the conditions that society offers – such as emotionally safe work environment and fair rewards.

The solid foundation of any successful company is its people. Employees represent a source of knowledge and ideas, but oftentimes that resource remains untapped. Involving employees in the decision-making process not only empowers them to contribute to the success of an organization, but also saves the company

time and money, in increased productivity and reduced outsourcing (Anderson, 2017).

2   Data and Methods

Drawing on theoretical background and published facts, a structured questionnaire was created together with questions for an interview in order to obtain primary sources of information and qualitative data. Within the formulation of the questions in the structured questionnaire originally constructed by authors we based our knowledge on the given vocational articles and publications.

The aim of the paper is to introduce our findings of actual trends in the work with human resources found out in surveys on agricultural enterprises in Slovakia.

In this paper, we specifically dealt with two topics: the management tools that top managers in agribusiness apply to work with human resources as part of their active participation in business decision-making and the forms of education as a means of human resources development in the enterprise.

The research was carried out between September 2017 and December 2017. The surveyed enterprises were selected from available agricultural databases (zas.sk, mprv.sk, infoma.sk, seznam.sk, sppk.sk, polnoinfo.sk, agrofood.sk). Agribusinesses – namely their top managers were contacted directly face to face, via Slovak Post, email. 395 agricultural enterprises were asked to fill the questionnaire and 47per cent of them were actively involved in the survey. As we expected only 26per cent of electronically contacted enterprises sent us a completed questionnaire.

Data processing was performed using MS EXCEL 2016 and SPSS. In the evaluation of the quantitative and qualitative statistical features the classification, relational and structural-genetic analysis was used. As a logical methodological principle of complementing the analysis, synthesis was used not only as the composition of individual phenomena or processes, but the creation of new entities. Mathematical and statistical methods and tests such as Friedman's test, Wilcoxon test were applied for statistical hypothesis testing.

3   Results and Discussion

Human resources management is a subsystem of organization management – integral, but relatively independent. The content includes personnel strategies, policies, systems and processes designed to provide competent and motivated staff to effectively achieve the organization's strategy. The main objective is to provide

motivated employees and to ensure their use of qualification and personal potential for the achievement of the goals of the organization. The subsystem's function is to manage people – individuals, teams and workgroups, ensure performance and employee development, an irreplaceable resource for each organization.

When employees are involved in making decisions, they gain a professional and personal stake in the organization and its overall success. This commitment leads to increased productivity as employees are actively participating in various aspects of the company and wish to see their efforts succeed overall. Actively engaging workers in the decision-making process increases the overall morality of the company. Many companies have a distinct separation of power between management and workers; however, active employee involvement lowers that gap, opening the lines of communication between supervisors and employees. Using employees in the decision-making process, rather than outsourcing, saves money, time, and offers the company long-term reliable assistance from those who know the corporation well. However, employees who are already aware of these processes, offer insightful knowledge of the company needs, and understand the policies of the company as a whole. Participation in the decision-making process gives each employee an opportunity to voice their opinions, and to share their knowledge with others. While this improves the relationship between manager and employee, it also encourages a strong sense of teamwork among workers. It is also a good way to gather information about employees as to how they work in a team environment, and where training may be necessary, all of which leads to an increase in effectiveness, and ultimately an increase in good teamwork and performance (Anderson, 2017).

In the first part of our survey we dealt with the issue of application of managerial tools in the enterprise, which lead to a higher employee involvement in decision making. Our chosen management tools that can lead to a higher employee participation in decision-making were tools like teamwork, corporate culture, teambuilding events and participation in the decision-making process.

As part of the survey of 185 farms, we have been dealing with the power of support that top managers paid to these four tools (Figure 1). 70per cent of respondents stated that teamwork is strongly supported in their business. In the surveyed agricultural enterprises employees would use worked in teams to manage given projects. Corporate culture with all its elements was an important management tool for 60 per cent of agrimanagers. In a half of the asked agricultural enterprises there was weak attention paid to the tools like "employee participation in decision making process." Teambuilding events were either supported to a very small extent or they were not supported at all. From the responses it is clear that

businesses are not willing to spend extra budget on teambuilding activities. Teamwork within projects is sufficient and supported.

We can state "employee participation in decision making process" is one of the most important tools to be implemented in the manager's work with human resources not only in agricultural enterprises. This can increase employees' motivation and effectiveness of the enterprise.

Figure 1 **Application of management tools leading to higher employee participation in decision-making**
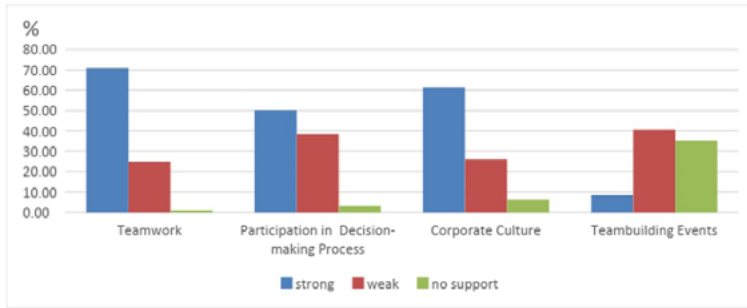
Source: Own research.

Mathematical and statistical methods were applied for statistical hypothesis testing. Using the nonparametric Friedman test (Figure 2), these two following hypotheses were verified:

H0: Management pays the same attention to instruments that lead to a higher employee participation in the decision-making process.

H1: Management does not pay the same attention to instruments that lead to a higher employee participation in decision-making process.

Friedman test shows us that p-value is 0.000. As we know, if $p < \alpha$ (0.000 <0.05), we reject the H0 hypothesis of equality. Friedman's Test confirmed H1 hypothesis: management does not pay the same attention to instruments that lead to a higher employee participation in the decision-making process.

Figure 2 **Friedman Test - Applying management tools leading to a higher employee participation in the decision-making**

Friedman Test
Test Statistics[a]

N	80
Chi-Square	108.910
df	3
Asymp. Sig.	.000

a. Friedman Test

Source: Own research.

Using a post-hoc Wilcoxon test we identified the difference between particular elements. The following hypotheses were formulated:

H0: Management pays the same attention to two instruments that lead to a higher employee participation in the decision-making process

H1: Management does not pay the same attention to two instruments that lead to a higher employee participation in the decision-making process

Figure 3 **The results of Wilcoxon test (p-value) for each combination of management tools**

	Teamwork	Participation in the decision-making process	Corporate culture	Teambuilding events
Teamwork		0,005	0,094	0,000
Participation in the decision-making process			0,442	0,000
Corporate culture				0,000
Teambuilding events				

Source: Own research.

The Wilcoxon test results are processed in the form of a p-values table (Figure 3). If the p-value is greater or equal to the significance level α, a zero hypothesis is assumed that there is equal support of two elements of an enterprise's internal environment. If the p-value is less than the level of significance α, we reject the zero hypothesis and accept an alternative hypothesis that management does not pay the same attention to two instruments that lead to a higher employee participation in the decision-making process.

Referring to figure 4 we can see (on the basis of p-values) that only two unbalanced groups were formed. The first group includes team work with an average value above 3.0 and corporate culture with an average value above 2.5. In addition to two instruments mentioned above, the participation in the decision-making with an average value above 2.5 is also included. The second group is made up of only one tool – teambuilding event. Teambuilding events are the least significant management tool for managers in terms of employee activation in business decision-making process. The average value is below 1.50.

Figure 4 **The perception of the importance of management tools that lead to a greater employees' participation in decision-making**

Source: Own research.

The second aim of the paper was to introduce the forms of education as a means of human resources development in the examined agricultural enterprise.

In the field of the development of human resources in agricultural enterprises, managers support staff development through different forms of education.

Figure 5 **Forms of education - means of human resources development**
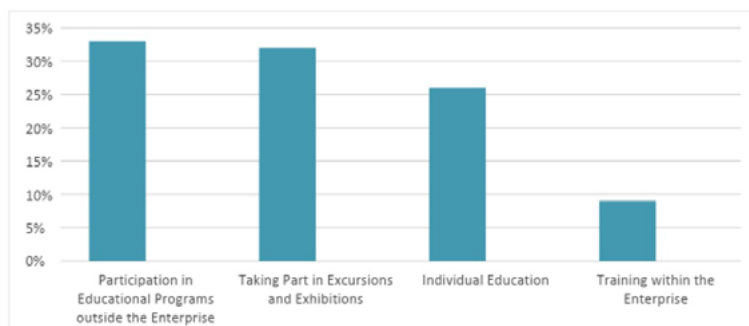
Source: Own research.

From the survey results (Figure 5) it is evident that the leadership of the organization particularly supports education through participation in educational programs outside the enterprise. The business environment itself is an incentive factor for employees. Another benefit of this form of education is the extent and value of new knowledge provided by experts of specialized training organizations. Another supported form of learning is participation in excursions and exhibitions, where the space for demonstrating new knowledge is more realistic. This expresses the positive perception of learning from the presentation of the results of progressive practice on specific examples.

Individual education follows. This result should make managers and their subordinates work hard and intensively on their personal development as the rating is quite high. Despite the fact that a large enterprise is not involved in terms of the number of employees, almost 10per cent of surveyed enterprises offer the possibility of enterprise education. This form of education is not one of the most preferred alternatives; probably because only a small number of enterprises organize their own business education and the participants in various educational events have difficulty concentrating on the subject, as they also think about their job responsibilities.

As for managers in the business field, it is inevitable to support especially methods of self-education, self-knowledge, self-organizing, self-control; in other words, self-development because it is difficult to penetrate the work of creative individuals but it is even more difficult to influence them (Šajbidorová, 2012). It is important to put emphasis on the inner motivation and self-development in business and managerial work.

4   Conclusion

The process of economic growth greatly depends on the qualification and use of human resources, of the creative, dynamic capacity of the human factor in the unfolding of economic life. It should be remembered that loyalty and employee engagement in business decision making must be the priority of top managers in the application ofmanagement tools.

In our survey, 185 agricultural enterprises were actively involved; we have been dealing with power of support that top managers apply in work with human resources in case of the application of management tools as part of their active participation in decision-making. In one half of the surveyed agricultural enterprises only small attention is paid to the employee participation in the decision making process and in case of teambuilding events, the situation is even worse. The second aim of the paper was to introduce the forms of education as a means of human resources development. The survey results should remind managers and all employees to be involved in all possible internal or external forms of education in the enterprise, to work hard and intensively on their personal development.

The following recommendation follows: the competitive advantage for not only agricultural enterprises could be the possibility of the retention of the work-force, reducing the fluctuation of employees, the necessary training with a positive impact on the overall performance of the company. The top management has to follow and implement new trends in the work with human resources management used in international corporations purposefully. This can help employees to be quality and desirable human resources also in the future.

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DEVELOPMENT OF WELFARE FARMS IN POLAND AS AN INNOVATION IN SUPPORTING INDIVIDUALS WHO HAVE BEEN, OR ARE ON THE VERGE OF BEING SOCIALLY EXCLUDED

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Abstract

More than 15.2 million people live in rural areas in Poland, of which over 2.1 million are people over 65 years old. It is forecasted that by 2035 the number of these people will increase by almost 60%, to over 3.4 million, and their percentage to the general population from the current 14% to 22%. Thus, the aging of the rural society will be manifested both in the overall increase in the number of elderly people living in rural areas and in the increase in the proportion of seniors towards the general population. The scale of the phenomenon will have a significant impact on the image of the Polish countryside: more and more of its inhabitants will require support in their daily functioning and creation of a dedicated offer, both in the field of public services and services provided within the non-public sector. In view of the above data, which indicate that one of the main problems are demographic issues, an aging population and multifaceted problems of social exclusion, the full mobilization of human and social capital is extremely important. Solutions are sought, which will be the most effective in caring tasks, but also will strengthen the economic potential. In Western Europe, for several decades, the idea of social farms has been developing, whose operation is not only an interesting form of diversifying sources of farm income, but above all an effective form of counteracting the deepening of social exclusion of people who are unable to care for their basic needs (people with intellectual and physical disabilities, the elderly, and even people with a criminal history). The role

of the social farms is to create such conditions that would allow the return to society, the independence or remoteness of the moment when the care of a person is taken over by the institution of care (old age homes, nursing homes, hospitals). The aim of this article is to present the effects of participant observations carried out in pioneer care farms in the Kujawsko-Pomorskie Voivodeship covered by the substantive and financial support program by the Agricultural Advisory Center in Minikowo. The study used qualitative methods in the field of ethnography and sociology (participant observations and narrative interviews). The research was conducted from September 2016 to August 2017 in 10 social farms in the districts of: Brodnica, Mogilno, Świecie, Tuchola and Wąbrzeźno. The article, however, presents the results of observations from the farm, which was considered to be exemplary, and thus the work of this farm was deemed worthy of dissemination. This example also opens up a wide field for discussion (more on this in the main part of the article) around the problem of qualitative evaluation of the activities of social farms.

Keywords: *welfare farms, green welfare, quality study*

JEL classification: *Q10, Q12, Q13*

1   Introduction

Rural areas in Poland are inhabited by over 15.2m people, out of which 2.1m are 65 years old or over (CSO, 2016). It is estimated that by 2035 the number will increase by 60% to reach 3.4m, the growth from 14% to 22% of the whole population of the country (CSO, 2014). Ageing of the society in rural areas will manifest both in the general increase of the number of the elderly citizens as well as their quota within the whole population. The scale of the phenomenon will significantly shape the future image of the Polish countryside: the number of country dwellers who depend on support of others in everyday life will increase. A new dedicated offer aimed at helping such people in the public and non-public sectors will become more urgent. The statistical data indicates that the main problems are the current demography trends, the ageing of the society, and multidimensional problems of social exclusion. The most important factor which has the potential to remedy this unfavourable situation is full mobility of the human and the social capital.

According to Anthony, "social exclusion occurs when individuals are denied participation in the life of a society" (Giddens, 2006, p. 346). The term "social exclusion" is often replaced by scientists with "underclass" (Murray, 1996) or "the culture of poverty" (Lewis, 1966). Zygmunt Bauman illustrates the problem of social exclusion by using such pejorative terms as "discarded", "junk", or "spare" in

order to describe the people who fell victim of advancements in technology and economy, modernisation or, as in the case of Poland, the fundamental political changes (Bauman, 2004, p. 13). Bauman argues that the phenomenon of social exclusion is characterized by its inevitability and the global dimension, the two factors which render any attempts of finding local remedies even more difficult. The level of social exclusion can also be measured by the degree in which citizens engage in public life, participate in elections, take part in the life of certain civic organizations, or are involved in such basic activities as tourism, spending holidays or consumer behaviour. Developing relationships between community members is yet another measure of social participation, which manifests in the number of acquaintances one can depend on in emergency, the frequency of social meetings, and engaging in charities and matters not aimed at bringing material profit. As these forms of participation decrease and become more feeble, so do the contacts between citizens, which results in increasing social isolation.

Due to the fact that the European societies become increasingly "grey-haired", they require more care and attention. Increased life expectancy and better general physical condition notwithstanding, sadly there are no prescriptions for alienation, which is the growing concern among the elderly. The current situation requires finding such solutions, which would effectively provide care for those who need it, while securing the economic growth of the country. Ideally, citizens should be entitled to free social welfare schemes provided by the National Health Service. However, the Polish citizens and those living in other states from the former Eastern Bloc can still remember the cruel reality of the socialist system. For the reasons mentioned above, contemporary welfare services tend to be allocated to non-government organizations belonging to the private sector, particularly those which operate locally, such as families who live with the elderly (Błędowski & Kubicki, 2009, 2009b, Mestheneos & Triantafillou, 2005). While the character of these sectors (informal – provided by a family, public, non-government, commercial) may differ from country to country, their foundation remains the informal character of care provided by a family (Mestheneos & Triantafillou, 2005, p. 14).

This model has been successfully developed in western Europe for decades. Farms offering family welfare schemes for the elderly are not only an interesting form of farmers' diverse activity which generates additional income but, primarily, an effective way of overcoming the problem of social exclusion among those citizens who are unable to secure their basic needs (e.g. mentally or physically disabled people, the elderly, or even former inmates of correctional facilities). The role of welfare farms is to create such conditions, which would help their beneficiaries re-integrate with the society, become more independent, and postpone

the moment when a these people require institutional care (care centres, old people's homes, etc.).

First welfare farms were established over a hundred years ago, at the beginning of the 19th century, as asylums for mentally disabled people. Unfortunately, instead of providing care which those people needed, their role was to separate them from the rest of the society. Despite this apparent injustice, it was soon noticed that being surrounded by nature and the rural environment helped to soothe patients with disorders. Engaging in simple farming jobs proved to have beneficial effects for the patients who, to use simple terms, started to feel needed. The therapeutic effects of being surrounded by the "green space" was observed as long time ago as the Medieval Ages. Gardens were built next to prisons, hospitals or monasteries to help patients recover from their illnesses (Sempik et al., 2010, 13).

The 20th century brought rapid development of agriculture in Poland. Farms became large specialized plants producing and processing foods (Brown et al., 2005; van Zanten et al., 2014). Their successful operation depended on farmers' competence and professional know-how, having access to the latest information, and assistance of advisory centres (Prus, 2017; Prus & Drzazdzynska, 2017; van den Ban & Hawkins, 1996). When faced with such competition, smaller farms, which often passed from generation to generation, were forced to look for alternative sources income (Carter, 1998; Marcysiak & Prus, 2017). This led to the increased interest and importance of multifunctional development of rural areas in Poland (Prus, 2010, p. 15-16; Runowski & Ziętara, 2011; Kalinowski, 2013; van der Ploeg & Roep, 2003), which started to adopt new economic and social functions. The change was fuelled further by the development of tourism (Bessière, 1998; Garrod et al., 2006; Getz & Carlsen, 2000), agritourism (Brandth & Haugen, 2011; Roman et al., 2017; Tew & Barbieri 2012), and eco-farming (Michelsen, 2001; Padel, 2001; Pugliese, 2001). This is how small farms were often transformed into welfare farms, whose owners looked for new and alternative sources of income, and were able to provide patients from different welfare institutions with new forms of individual care. The term "welfare farm" has several synonyms in professional literature: "green care farms", "social farming" or "therapeutic horticulture." It was the Dutch who pioneered the idea of using farms for therapeutic purposes. In Holland the number of green care farms increased from 75 in 1988 to over 800 today, which makes the country the European leader of welfare farming (Elings & Hassink, 2008, p. 310). Countries with only slightly lower number of welfare farms are Italy (almost 700), France (over 500), Norway and the Flanders region in northern Belgium (over 400) (Kamiński, 2015).

It is not merely the value of local assets which plays a key role in promoting welfare farms. Social background as well as well-established tradition, one in which people appreciate and understand the nature treating it not only as a resource but common good which serves generations, are also very important factors. For many people green care farms conjure up the images of homestead and peasants, strong family bonds and treating work on a farm not solely as a source of income. This view is especially popular among the Italians. Francesca Giarè, the Italian researcher from Istituto Nazionale di Economia Agraria, argues that social farming (L'agricoltura socjale) is a natural derivative of the Italian farming tradition, and should be treated as innovative for several reasons. Firstly, it is characterized by its ethical and social context and can quickly respond to consumer needs providing high- quality produce. Secondly, it adds a multifunctional dimension to farming, which can offer employment opportunities to the socially excluded. Thirdly, the work on a green care farm is an excellent way to complement the medical and care services provided by the state, having the potential to affect and redesign the existing system (Giarè, 2009, p. 5). Not long ago, in 2009, the idea of green farming was obscure in Italy, and the farmers who wanted to start providing welfare services did not know where to begin. The authors of the "Social farming" guidebook propose building strong relationships between the farmers and local non-government organizations such as schools, whole communities, volunteers and businesses. They argue that green farming can thrive especially when different institutions and environments are activated. The next step is to taking initiative, exchanging information, participating in training courses where farmers can exchange ideas, share experience and implement new solutions together (Giarè, 2009, p. 6).

The evolution of welfare farms throughout the years allowed European farmer to gain new valuable experience. They have learned that together with their farms, they need to be better prepared in order to face new challenges. They have come to realize that they can provide help not only for the people who cannot function in the society due to their physical disability or old age, but also for patients with disabilities resulting from mental disorders (Elings & Hassink, 2008, p. 310). As such, welfare farms fulfil their therapeutic task.

However, to quote the popular saying, it is "easier said than done". One must realize that adapting a farm to meet the new functions of the welfare farm is not an easy task, and not merely because of the cost of infrastructure. Sadly, contemporary farms ceased to be characterized by their cultural, mystic, and magical spirit. These values have become a commodity, and many farms are basically businesses that have lost their farming identity (Kocik, 2000, p. 58). On the positive side, the development and changes which are have been taking place are fuelled

by people with fresh approach, individuals with little or no farming background. These people often have new interesting ideas regarding the use of land, space and surroundings. They realize that apart from its production potential, nature offers numerous aesthetic and leisure opportunities (Gorlach, 2004, p. 155).

2   Data and Methods

The growing number of welfare farms requires constant monitoring from institutions, health service agencies and the government. The Dutch researchers advocate a combination of the quantitative assessment (focused or semi-structured interviews) and the qualitative assessment (surveys and questionnaires) (Elings & Hassink, 2008, p. 311). In the case of our study there is no need to use the quantitative assessment due to the simple fact that there are few welfare farms in Poland, whose main activities concentrate around diagnosing the clients' problems, assessing the amount of help needed by other welfare institutions and, most importantly, investigating the surroundings of the welfare farm (neighbour opinions, the degree of assistance, which might be obtained from other non-governmental organizations or the council).

The aim of this article is to present the effects of participant observations, which have been conducted among the pioneer welfare farms in the Kujawsko-pomorskie region. The farms were offered professional know-how as well as financial support and by the Agricultural Advisory Centre in Minikowo.

The research involved the qualitative methods used in ethnography and sociology (open participant observations and narrative interviews). The research was conducted between September 2016 and August 2017 in 10 welfare farms from the following districts: Brodnica, Mogilno, Świecie, Tuchola and Wąbrzeźno. For the purpose of this article the authors decided to limit the volume of data and only to include the main conclusions.

3   Results and Discussion

Ryszard Kamiński, the director of the Agricultural Advisory Centre for the Kujawy and Pomorze region (KPODR) based in Minikowo, is a keen supporter and enthusiast of developing welfare farms in Poland. Currently, the centre is introducing another project which aims at development of day care within the Operational Programme for 2014-2020 (Priority 9: Social Inclusion; Primary Goal 9.3: Development of Health and Social Services; Secondary Goal 9.3.2: Development of Social Services). In the autumn of 2016, 15 farms from the Brodnica, Mogilno, Świecie, Tuchola and Wąbrzeźno districts were authorized to provide welfare

services. After the carers had completed their training, and the farms had been adapted to meet the requirements of new clients, the farms started providing the services in January 2017 and will continue to do so until mid 2018. The participants of the programme are people who depend on others' help in everyday life. They will be able to benefit from support and therapy in groups consisting of 3 to 8 members, 8 hours a day, 5 days a week. Every person who is eligible for the scheme (225 people) is guaranteed to use the service for 6 months. The project provides farmers with assistance, facilitates the functioning of the welfare farms, helps to develop the range of services, and adjusts therapy to the needs of individual patients. Both carers and the cared have access to a psychologist at all times. Typically, the elderly in Poland can benefits from individual care for up to 8 hours a day. While this may seem enough, in fact they often suffer from loneliness, which may lead to different forms of mental disease. The project promotes group therapy, which helps to overcome this problem. The concept of the welfare farm scheme has been consulted with the Ministry of Agriculture and Rural Development. The Agricultural Advisory Centre for the Kujawy and Pomorze in Minikowo together with the Agricultural Advisory Centre in Cracow have been working towards securing the official recognition and legal status for functioning of the welfare farms in Poland. The analysis of the empirical data obtained through the interviews and information obtained from participant observations allowed us to formulate numerous important conclusions. They can help us to evaluate the functioning of welfare farms which are taking part in the project.

At the moment the model farm achieving the best results is the "Kociewska Toskania" farm (the Kociewie Tuscany) farm run by Ms. Sara Valentini Pstrong and Mr. Arkadiusz Pstrong.

Surrounded by lush green forests, fertile fields and other arable land, the farm boasts perfect infrastructure for a welfare center. The owners keep horses but the farm specializes in rearing donkeys, which are not bread for sale or meat. Although the animals are not allowed in the house, they enjoy a special status nevertheless, and are treated as "co-workers." In fact, every creature living on the farm brings something into it. Other animal residents include dogs, cats, horses, geese, an alpaca, pigs, numerous swallows and even bats. The owners of the farms act as the carers and look after the patients. According to Mr. and Mrs. Pstrong, creating space where patients can spontaneously interact with the animals is very important and has therapeutic effect. Having said that, they stress that the safety of the patients' is paramount. The inmates do not like to be referred to as "patients." They are treated as guests in Sara and Arek's house, guests who may require extra attention, but guests nevertheless. The first effects of the therapy are very promising. Evidently, during their stay at the "Kociewie Tuscany", the patients have built

their self-esteem, started to engage in conversation and plan their daily activities, they have also become more confident when making decisions, which are not questioned by their carers. As they say, "We finally feel accepted. It is very important to us." This positive change is also confirmed by other people, neighbours and friends, who noticed that the patients have become more confident, they leave the farm more often, walk or go shopping, etc. Another positive change is the increased awareness of the state of personal hygiene (now the patients change their clothes more often, comb their hair, shave and, above all, wash or take a shower). Interestingly, those patients who were reluctant to participate in group work, now assign themselves tasks which require them to remain in closer proximity to others. In other words, they still tend to work separately but, actually, they are nearer, keeping others in sight. Preparing meals together also helps to bring the patients together. They cook and share kitchen duties on a fair basis. They even vote for the menu for the following day. All this helps to increase one's sense of being independent, and teaches how to be responsible for other members of the group.

As a scientist, I tend to remain sceptical with regards to research results. Unfortunately, in this case it is difficult to question the results of the observation since there is no control sample. It is not possible to compare conditions created by welfare farms with clinical conditions provided by hospitals. The only alternative is to monitor the evaluation methods and scrutinize the results. The research results prove that welfare farms in Poland are subject to constant scrutiny by the project co-ordinators from the Agricultural Advisory Centre for the Kujawy and Pomorze region (KPODR), who visit each farm at least twice a month and check if the owners follow the standards declared in the initial stage of the project. What is more, once a month the patients have a meeting with a representative from the co-ordinating team in Minikowo, and a psychologist. The main difference between welfare farms in Poland and their west European counterparts is that the former lack in the formal status. Welfare farms, such as the "Kociewie Tuscany", can be found in Belgium and the Netherlands. They provide similar high-quality services.

4   Conclusion

Despite the fact welfare farms have a long tradition in Europe, they all seem to face similar problems. Due to the fact that the Dutch have considerable experience in this mater, their observations are particularly important. They argue that "green farms" have beneficial influence on "guest-patients" who improve their mental and physical state. The patients themselves claim that by staying on green farms they are fitter, feel needed again, and it helps them to regain their confidence and

self-esteem. These opinions were confirmed in the course of our research. The problem, for which the Dutch have not found a satisfactory answer yet, is what future awaits the welfare farms? The funds and programmes are bound to come to an end eventually. The patients will not be able to continue living on the farms any further because the farms were not meant to act as the final stop in their lives (Elings & Hassink, 2008, p. 320). Polish farmers are still learning about the nature and successful operation of welfare farms. There is one advantage, however, makes welfare farms in Poland different from the west-European counterparts: they are characterized by their communal character rather than being associations. While it may seem like an obstacle, especially with regards to the development of farming, it is actually a considerable benefit in the case of farms providing welfare services. To sum up, Poland has considerable potential, which may and should be used to combat social exclusion while bringing income for family-run farms.

Let us end this paper with a quotation from the co-owner of the "Kociewie Tuscany" welfare farm: "As far as I am concerned, [our activity] is just welcoming guests into our house and treating them with sincerity and respect they deserve. In my opinion, what they really need is the feeling of being accepted. By belonging to and participating in the life of an alternative social group they are given the opportunity to feel safe and find the long-gone joy of living."

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ANALYSIS OF THE SECTORAL ENVIRONMENT IN SELECTED COMPANY ACCORDING TO PORTER

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Abstract

At the present time, full of dynamic changes, the necessity of a quality management system and its introduction is quite obvious.Due to strong competition, a growing number of enterprises, and ever-increasing customer demands, companies are introducing quality standards into all business processes.Our modern era requires companies to constantly analyze and monitor the environment in which they operate. It is important to foresee the trends and changes so that organizations can have enough time to react.In our work, we focused on five key areas that described it as a whole.In the beginning, we paid attention to the size of the mechanical engineering sector in which the company operates.In other parts of the work, we focused on the analysis of the power of suppliers, purchasers, and competitors.The other two points of the analysis were the threat of entering the industry, and we described the possible substitutes.The result is a table that gives the ratio between the factor and the level of risk represented for the organization.From the Porter analysis table, it is clear that the situation of Eurosvit, s.r.o. on the market is positive. It is obvious from this synthesis that Eurosvit can expect a demanding period of continuous improvement with regard to the strategic objectives, which are very challenging and ambitious.In particular, the focus should be on the continuous improvement of all business processes and quality, which will lead to improved overall performance and competitive advantages.

Keywords: *enterprise, business, analysis, industry environment, Porter's model of five competitive forces*

JEL classification: *M130, M000, M190*

1   Introduction

Industry environment is very important for organizations. There are many definitions of company´s surroundings. The authors, Majdúchová and Neumannová, understand the surroundings of the enterprise as "a summary of the elements of the environment with which the enterprise is in mutual bond. Ľ. Strážovská and colleagues define the business environment as a set of elements that can affect SMEs directly or indirectly but also small and medium-sized businesses can influence their surroundings positively or negatively.To characterize the sectoral environment of the engineering company Eurosvit, s.r.o., we used Porter's Model of Five Competitive Forces, which will give us a picture of both the company itself and the environment in which it operates. Through this analysis we obtained an overview of the competitive environment and substitutes that can pose a threat to companies. At the same time, we determined both the power of the supply and demand chains. The concept of competitive forces that define the industry environment was created by Michael Porter, according to which it is formed by the rivalry between existing firms, the threat of entry of new competitors, the threat of substitution, the economic power of suppliers, and the economic power of customers.

1.1   Size of the industry

In Porter's analysis, it is first necessary to define the size of the industry in which the organization operates. We consider a sector as a set of organizations or companies whose main business activities are similar or the same. Our attention was focused on the mechanical engineering in Slovakia, where the company Eurosvit, s.r.o. is included. Industry as such belongs in Slovakia to the engines of economy and decisively participates on the creation of the gross domestic product. According to Eurostat, the Slovak Republic belongs to the Top 10 countries of the European Union regarding the share of the engineering industry in the total GDP of the country. The average of the Eurozone is 17% and in the case of Slovakia it is 22.8%. At the head of the table is the Czech Republic with 29.2%. According to the statistics of Finstat and its database in the category of metalworking and metallurgy, from the total of about 419 000 companies 6 320 operate in the field of metalworking and there are 3005 companies in engineering, which makes a total of more than 9 300 companies that are engaged in this activity in Slovakia. In the Region of Nitra, understood as a region, we include 1 210 companies.

2 Data and methodology

The aim of the article is to analyse the sectoral environment from the view of the company Eurosvit, s.r.o. according to Michael Porter. The analysis divides the sector into five areas that describe it as a whole. In the introduction, our attention was focused on the mechanical engineering in Slovakia, where the company Eurosvit, s.r.o. is included. The size of this industry was calculated according to data from organization called Finstat. In the next part of the work, we described the power of competition, substitutes, buyers and suppliers. The last part describes the barriers to entry into the sector. At the end of the article, the results of the analysis are shown in an overview table. The data needed to perform the sectoral analysis were obtained from the company's internal resources.

3 Results and discussion

According to our research in the selected company Eurosvit s.r.o. we analysed five areas of sectoral environment.

3.1 The power of suppliers

In the area of suppliers, we will concentrate mainly on the suppliers of metallurgical materials, which make the largest share in the structure of the suppliers of Eurosvit, and they are also the most important ones, as the input materials (metal sheets, stainless steel sheets, etc.) are crucial to the company. During the existence of Eurosvit, we have encountered a number of market situations and have undergone different developments even with sheet metal suppliers. In the past, the company struggled with timely deliveries, quality and prizes. Currently, as it has a better bargaining power due to its volume of production; the situation has considerably improved. At present we consider the quality of the supplied sheets and input materials to be the biggest problem. With high-quality production and world-class customers (Scania, Husqvarna, etc.) that emphasize quality, the quality of Slovak suppliers of metallurgical materials is insufficient. The lack of quality is particularly evident in thicker sheets where the required size and tolerances are not met. This affects the production process and leads to a higher number of rejects and complaints. This situation is considered to be the greatest threat at this time. It has at least been partially resolved by the purchase of metal sheets through the Swedish partner from Scandinavian manufactures, in incomparable quality. On the other hand, the export of Sweden to Slovakia and the surrounding countries in any area, especially in the import of metal sheets, is minimal, and that is why the prices are not competitive in the long term.

3.2 The power of purchasers

Customers are key players from all aspects of the company. They play a particularly important role in engineering, where a large number of different companies are operating, and these companies can easily cover the demand, i.e. the competition is rampant.

In the past, Eurosvit, s.r.o. struggled with a very unstable structure of customers, where the demand was covered by three large companies, so the risk of loss and subsequent existential problems were very high. This risk materialized during the economic crisis at the turn of 2008 and 2009, when the company lost its largest customer.

At present, we can talk about an optimal customer structure, where the risk has already been diversified. The added value was brought by the Swedish company Laserkraft, which got Eurosvit from regional to the international markets, thus making it possible for us to reach foreign customers.

3.3 Competition

Today, when the borders between countries are getting less important and with very rapid technological advances, we are talking about transnational competition or a competitive environment. In the past, the company Eurosvit, s.r.o. operated in a small regional market and supplied mainly smaller regional customers. Through gradual development and, in particular, entering the joint venture; its horizons have expanded and we are now talking at least about the European market and growing competition. In Slovakia, the engineering industry is the driving force of the economy, and for this reason we are speaking of the fragmented structure of competition, which is formed by a large number of enterprises of different size, mostly micro, small and medium. This condition also defines the operation of individual companies, since none of the enterprises has a major impact on the development of this sector. In the engineering industry, we are facing a very strong competition, which is characterized by price wars and often unfair practices. Undertakings often operate with low margins and below prices, which has often led to their failure. In this situation, Eurosvit should clearly choose for a customer diversification strategy to spread the risk in the best possible way and build a long-term and sustainable competitive strategy, which will be based on high-quality products. On the other hand, it is necessary to mention the exit barriers from the sector, which play an important role. Companies usually work on the basis of long-term agreements or contracts (with both suppliers and customers) and for this reason the exit from the sector is time consuming and costly.

3.4   Entry barriers in the sector

In the previous section, we have described the existing competition and the competitive environment. On the other hand, it is also necessary to think about the future competition, in other words, the entry into the sector. In this section we will describe the barriers that make it difficult for new companies to enter the engineering industry. We have defined the following main entry barriers:

- **capital investment and technology**

The engineering industry in Slovakia has its relevance, significance and rich history. For a number of reasons, doing business in this field is very demanding for most companies. One of these is the investments themselves, which are very high throughout the whole operation of a company. Technological advances, new market developments, the introduction of new systems or software are costly in financial terms but unavoidable in the face of competitive struggle and market sustainability.

- **high input investments**

High entry investments are considered to be one of the key factors that prevent companies from entering this industry. High investments in machinery, various support systems and software are insurmountable in many cases. It is necessary to realize that entering the engineering industry is not possible from day to day, which can be considered as an advantage for the existing companies.

- **savings from overproduction**

As we mentioned above, the competitive struggle in the engineering industry is really very strong. Companies are fighting for each customer, and price warfare is on a daily basis. It is precisely for this reason that savings from overproduction or production volumes are very important. This is the purchase of materials, or all input materials and, of course, also the investment in machinery and constant development. We consider savings from overproduction to be one of the most important competitive advantages of the existing businesses.

- **structure of competition**

As we have already mentioned several times above, the competitive struggle is very strong in the engineering industry, and this fact can discourage the companies which consider entering the industry. Saturation of the market and a large number of small firms are characteristic phenomena.

3.5   The power of substitutes

The engineering industry in Slovakia has its rich history, and many companies have been drawing from it even today. In the past, there were large engineering

factories, which produced generations of skilled engineers and contributed to the building of education in this field. At present, Slovakia is considered to be an automotive great power, which significantly affects the mechanical engineering. In the case of substitutes, namely products that satisfy the same customer needs, it is possible to consider the market situation as a positive one, offering good opportunities for Eurosvit. The only alternative that has been piloted before is the products in the plastics industry. Compared to metal components, they have lower weight and even price, which can be interesting for customers. Many companies that have tried other alternatives have often struggled with poor quality and have come back to engineering products again. We must not forget about the high environmental protection requirements connected with plastic materials.

From the analysis of the sector, we can conclude that we have identified more opportunities than threats for the company Eurosvit, s.r.o. Due to our research in the selected company, we estimated the level of risk in each part of Porter analysis. Despite the fact that the company is operating in a very strong competitive environment, where there is a daily struggle for customers, we can see an opportunity here in the form of a partnership with the Swedish company and in building a sustainable long-term competitive advantage. The competitive environment is also influenced by substitutes, but they do not play an important role here. Future competition and the threat of new competitors on the market is in the case of the mechanical engineering industry very limited, particularly in view of the high investments (entry investments even during the existence of the company). Organizations usually work on long-term contracts; therefore, the entry and exit are time-consuming and, most of the time, financially demanding. Eurosvit, however, has to pay attention to its suppliers, increase input control and ensure competitive prices. Concerning our customers, the company has undergone a considerable development, and the structure of our customers is now considered optimal. The results are summarized in the overview table.

Table 1 **Impact of Porter analysis factors and risk rate**

Factor	Risk rate
Power of suppliers	Medium factor impact
Power of purchasers	Medium factor impact
Risk of the entry of potential competitors	Low factor impact
Threat of substitute products	Low factor impact
Competition	High factor impact

Source: Internal data of the company Eurosvit, s.r.o.

4 Conclusion

Eurosvit, s.r.o. is a stable engineering company that has been operating on the market for over 17 years. From a small, one-person company, it has developed into a mid-sized business with a young top management who are not afraid of changes. By constantly monitoring the environment in which the organization operates, Eursovit has been able to build a stable position, anticipate changes and promptly react to them. Sectoral environment analysis is a stable part of it.

From the Porter analysis table, it is clear that the situation of Eurosvit, s.r.o. on the market is positive. In the context of five competitive forces, only the strength of the competition has a significant impact on the future functioning of the company. Competition in the engineering industry is strong, mainly due to the rich history of the sector in Slovakia, the large number of small companies operating on the market and the elimination of borders between countries. The power of buyers and suppliers and its impact have been assessed as moderately high. The customer structure of the company has been changed successfully and significantly, and we consider the risk to be diversified in this field. On the other hand, the input material suppliers are crucial, but even in this area, the company has spread the risk over numerous businesses. The risk of the entry of potential competitors has a low impact, according to our analysis; it is mainly due to barriers to entry into the engineering sector. We evaluated the impact of substitutes as very similar, especially due to the properties of engineering products, which can only be replaced with difficulty.

It is obvious from this synthesis that Eurosvit can expect a demanding period of continuous improvement with regard to the strategic objectives, which are very challenging and ambitious. In particular, the focus should be on the continuous improvement of all business processes and quality, which will lead to improved overall performance and competitive advantages. However, we must not forget the risks arising from the sectoral environment, such as competitive struggles, price wars, or price changes in input materials. On the other hand, through a strong organizational structure and culture, support from the partner company and a good customer structure, it is possible to prepare for these changes in advance. Nevertheless, the engagement of all employees in the company is also indispensable.

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ANALYSIS OF THE QUALITY CONTROL PROCESS IN SELECTED COMPANY

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Abstract

The current fast changing times represent a situation that requires demanding solutions and decisions from companies. On the other hand, proactive companies see it as a challenge, and by the constant implementation of changes they can respond to environmental pressures. Businesses that are constantly moving forward define and improve their processes and follow the trend of quality orientation in all areas and are able to participate and succeed in the competitive struggle. In this way, they can build competitive advantages that are sustainable over a long term. Currently, quality refers to all areas, not just products. However, for manufacturing enterprises, the quality of production and its subsequent control is a key area, and that is why such attention is being paid to it. Within the engineering company Eurosvit, s.r.o., we have carried out an analysis of the quality control process, which we consider to be essential. In the beginning, attention was paid to describing the process and its functioning within the company. In the next part of this work, we divided the process into three key areas, such as input, inter-operational and output control. Later, we were analyzing the complaints, which clearly belongs to the quality control process; they evaluate its performance through feedback from customers. The last part is devoted to summarizing the data obtained, and the output is a set of measures to improve the quality control process. We have stated the number of complaints in each year, but there more reasons why. The first is the detailed record we keep and the introduction of the information system and the second reason is the complexity of production; Eurosvit's orientation. According to our research we came up with four main areas which should be improved and those are higher operator engagement, increased training frequency, purchasing a 3D measurement device and introduction of night shifts.

Keywords: *quality control, quality, process, analysis*

JEL classification: *M130, M000, M190*

1   Introduction

Quality is a concept that can be understood in different ways and at different levels, depending on the company and management. The basic definition of quality according to Leščin is the compliance with the stated requirements as the object of customer satisfaction and quality as well as an emotional means of delighting customers. On the other hand, according to Korenko, a qualitative measure with such a set of custom features that meet the requirements of customers and other stakeholders. Quality in an organization can be understood as the quality of production or products. Control can then be defined as a systematic and continuous acquisition and analyzing information about the course and outcome of the managed process and acceptance measures to regulate it by detecting the deviations characterizing it the difference between the intention (plan) and the result of its implementation. On the other hand, quality is also perceived in terms of meeting customer needs and reaching their satisfaction. But quality must be based on the inside of the organization and its internal needs. It begins with the quality of the organizational structure, processes, and it continuously follows the production and, afterwards, customer satisfaction. If the company wants to increase its overall performance and ensure growth, it must implement a quality system and quality management in every single area of the organization. Only an integrated system can produce positive results. It is precisely because of the growing importance of quality that we decided to analyze the quality control process, which we consider to be a key factor for a manufacturing company.

1.1   Quality policy

In order to make it possible to analyse the quality control process, it is necessary to know the quality policy established by the company. Eurosvit, s.r.o. has developed a quality policy, whose main goal is to achieve customer satisfaction. The management of the company is responsible for the elaboration of the quality policy, and all of the executives are made familiar with it. The company is committed, in the framework of the quality policy, to fulfilling all the requirements resulting from the ISO 9001:2008. The main objective of the company, within the framework of quality policy, is the constant improvement of the efficiency of the quality management system. Quality policy represents a framework for setting the quality objectives and will be constantly reviewed to meet all the needs of company. The main principles of the quality policy of the company Eurosvit, s.r.o. are the following:

- stabilizing the position of the company on the market and ensuring the conditions for its continuous development,

- ensuring a process approach that includes the definition of the main processes, process owners as well as systematic measurement of process capabilities and performance, and analysis of results,
- creating an organizational structure that meets the latest trends of the new organizational model. The organizational structure is flexible, flat, network, team and global,
- continued efforts to best meet the needs of clients and the evaluation of customer satisfaction,
- providing the employees with access to lifelong learning,
- accurate and clear definition of the responsibilities and competencies of all employees,
- effective communication throughout the company,
- continuous development of infrastructure and use of information technology in order to achieve the desired quality and thus meet the needs of our customers,
- ensuring continuous improvement of the company in all areas (product development, performance of the company, use of new technologies and procedures, etc.)
- optimizing the use of all company resources,
- taking responsibility for our products

1.2 Quality control process

For a manufacturing company such as Eurosvit, s.r.o., quality control is one of the most important business processes. Quality is understood in several ways. In our article, we will focus on the quality of products. The quality control process in Eurosvit, s.r.o. is carried out at three basic levels, input, inter-operational and output control. Each department in the company Eurosvit, s.r.o., technologists, foremen and operators must pay attention to the quality of products. The most important role here is played by the Technical Quality Control Department, with two controllers. A part of the trained operators are authorized to perform inter-operational checks. The basic prerequisite for high-quality products is meeting customer's requirements with our products. In most cases, production is based on drawing documentations, which contain all the necessary data (material quality, dimensions, etc.). Eurosvit's general rule is to inspect 10% of its production. However, there are exceptions when a larger proportion of products are examined, mainly because of a higher number of complaints in the past and in the light of experience. All necessary data are included in production plans and also in the production software.

Quality control in Eurosvit is focused on the following areas:
- checking the key dimensions
- visual inspection (ridges, scratches, etc.)
- checking the accuracy of materials (quality, thickness, etc.)
- surface treatment inspection
- checks on packaging

2   Data and methodology

The main objective of the article is to describe and analyse a part of business processes in the company Eurosvit, s.r.o., the quality control. The very quality of products is a key to the company. In this article, special attention was paid to the description of the quality control process; it was divided into three areas: input, inter-operational and output control. Each type of control has been described in details. The next part is devoted to the analysis of claims with an emphasis on their number. The last part of the work consists of a set of recommendations for improvements, as the total output of the analysis. The data that were used to perform the analysis were obtained from the company's internal resources.

3   Results and discussion

In the analysis of the quality control process, we divided it, for clarity, into three areas that we describe below.

3.1   Input control

All manufacturing processes depend on and develop from the input control, and therefore this type of control is crucial. In Eurosvit, s.r.o., it is the input material (especially the sheets) that is primarily inspected, and there is an act of communication between the purchasing and quality control departments. In this case, both controllers and stock-keepers are informed in order to ensure the unloading and inspection of the input material. The input control record is also stated on the production plan, and it is not allowed to use the material without its completion. A specific part is the control of semi-finished products, which the company purchases from its suppliers. In the case of sheet metal, the trained staff are also able to perform the check; but for semi-products (nuts, pipes, fasteners), the inspection must be carried out by a quality inspector, who has the necessary skills.

3.2 Inter-operational control

As it is already clear from the title itself, the inter-operational control is carried out between the individual operations during which the product is manufactured. Individual operations are recorded on the production plan, which begins and ends with quality control (input and output) records. For simple products (laser cutting, cutting, etc.), the inter-operational control is omitted; and obviously, it is also skipped with products that are made in one operation. Eurosvit introduced inter-operational controls before the implementation of the ISO 9001 standard in 2015, mainly due to the increasing number of complaints and rejects. In the case of complicated products, susceptible to discrepancies, the production plan indicates the increased number of items that need to be checked and the operation after which it is necessary to carry out the inspection. As mentioned above, a part of the employees are entrusted to carry out self-checking and record it on the production plan. In other cases, the control procedures are carried out by the Quality Control Department.

3.3 Output control

The output control is the last operation listed on the production plan, and it is the most important procedure in the quality control process. In most cases, the controllers check 10% of the produced pieces, which are measured and visually inspected. More complex products are checked as necessary. In some specific cases, we record even 100% control. A specific case is the surface treatment inspection (cataphoresis, zinc plating, coating, etc.). The majority of products are usually sent for surface treatment after all processes have been completed in Eurosvit, then they are returned to be adequately inspected (some of the dimensions must be measured even after surface treatments) and packed in accordance with the requirements of the customer. If the situation requires, in exceptional cases, the controller is sent to the supplier to perform the examination there. The last point of the output control is the adequate packaging of products, which is the responsibility of the storehouse personnel. The products are visually inspected once again and packaged according to the customer's requirements, which are also recorded on the production plan. Unless there is a special requirement, the warehouse packs the products according to the general regulations.

3.4 Number of complaints

There is no more important indicator in the quality control processes than the number of complaints. Under the term *complaint* we understand, in Eurosvit, the

products returned by customers due to the lack of quality or other deviations. In most cases, the products are sent back to the company together with the documentation of non-conformity (description of the reason for the complaint, photo documentation, quantification of the possible damage sustained, the number of items claimed, the number of pieces produced, and the like). The Quality Department records such a complaint into the system, listing all available information, informs the technologists and evaluates the adequacy of the complaint. If a claim is considered inappropriate, it will be declined and the customer informed. If the complaint is justified, the controller and the technologist assess whether the product can be repaired, or it must be discarded and subsequently new pieces manufactured again. The items of complaint are physically stored in a special place and marked with green (already repaired), orange (suitable for repair) and red (inappropriate, necessary to discard) in order to avoid mixing these products. Upon resolving the complaint, the quality manager lists the additional costs incurred, draws the conclusions and considers the appropriate corrective measures (staff training, changing of technology, etc.).

In the graph below, we have stated the number of complaints in each year. The company Eurosvit, s.r.o. has been keeping detailed records since 2015, the year 2014 was recorded only later. We register the year 2017 up to 31 October 2017. The graph shows that the number of complaints is growing every year. An exception could be the year 2017, when it appears, at the end of October, that the number of complaints will be lower than it was in 2016. However, there are many reasons to explain it. The first is the detailed record we keep and the introduction of the information system, recording each complaint, describing the solution, calculating the costs, and proposing corrective actions. The second reason is the complexity of production; Eurosvit's orientation, after joining the joint venture, has shifted to world-renowned foreign companies that have high demands, and for this reason a higher number of complaints have been made. The last point is the increased management requirements and the introduction of the ISO 9001 standard. Of course, it is clear from the graph that this trend must be stopped or lessened, as it was also determined by the company in its objectives. Measures are proposed in the next section.

Figure 1 **Number of complaints**
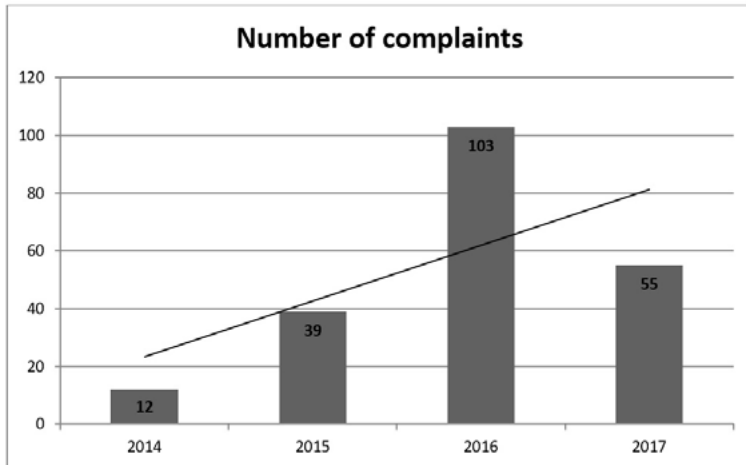
Source: Internal data of the company Eurosvit, s.r.o.

4   Conclusion

The number of complaints in Eurosvit, s.r.o. grows every year. In order that the company can alter this trend, it is necessary to implement a number of changes. We have identified four critical areas:

- **introduction of night shifts** (a foreman with 12 hours work time and a new controller)

Eurosvit employs two quality controllers, who cover the morning and afternoon shifts. The night shifts, which are characterized by a higher number of rejects, in spite of the fact that only a small number of operators work, are without a controller. We are fully aware that it is necessary to resolve this situation. We suggest employing 12-hour work time controllers, but this may be partly inefficient. The second solution is to hire a new quality controller. The question, however, is whether his/her presence would be efficiently utilized during the night shift. The most effective solution is to train a foreman for night shifts, who would be able to substitute a quality controller during this period.

- purchasing a 3D measurement device

Quality controllers are currently working with manual measuring instruments, which makes their work very difficult. It is tedious, ineffective, and of

course, the human factor and errors in measurement also enter the game. We suggest purchasing a 3D measurement device, which has several benefits (higher efficiency, lower error rates, lower human factor impact, etc.)

- increased training frequency

As a matter of fact, in measuring and product quality controlling, the technology or trends are making huge advances. In this area, also in the context of the requirements of ISO 9001 on the constant improvement, we propose a higher frequency of training, especially for the quality manager and quality controllers.

- higher operator engagement

As we have already mentioned above, quality controllers are extremely busy due to the implementation of new products. In this case, we propose a higher involvement of the production operators, who could be involved in quality control; this way, the controllers could devote their efforts to other activities (inspection of measuring instruments, implementation of new products, proposal of remedial measures, etc.).

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LEGAL AND ECONOMIC ASPECTS OF THE DEVELOPMENT OF ORGANIC FARMING IN POLAND IN 2004-2016

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Abstract

This study is dedicated to considerations on organic farming as well as the analysis of Polish legislation and the state and trends of organic farming development in Poland in 2004-2016.

Organic farming is part of the idea of sustainable agriculture, where agricultural production takes into account the need to care for the natural environment (species health, care for the condition of waters and soils), as well as the needs of the people who run it (agricultural, i.e. economic and social).

An analysis of the development trends of organic farming in Poland allowed to conclude that the number of agricultural producers and the area of ecological arable land increased within the indicated period of time, although the highest number was noted in 2013. However, in the indicated period, the number of entities dealing in the processing of organic farming products grew steadily.

Given the regional disparities in the state of development of organic farming in Poland, it can be concluded that organic production does not yet dominate in those regions where small agricultural holdings are in great number, although in 2016 the highest number of entities included in the so-called organic agricultural holdings happen to be among such agricultural holdings.

Keywords: *organic farms, sustainable agriculture*

JEL classification: *Q01, Q12, Q13, K23, K32*

1   Introduction

Agriculture is one of the oldest human activities that people have been developing since they began to lead a sedentary lifestyle. At the same time, it is a very important branch of the economy, which, like other departments, has been subject to changes throughout history. The literature claims that after the mechanization, industrialization and automation, the time has come for the digitization of agriculture. The latter is also referred to as agriculture 4.0, that is agriculture using the world of new technologies such as: the Internet, mobile applications supporting farm management or drones. In reference to this, it should be mentioned that the subject literature also uses such terms as: industrial, post-industrial, conservative, self-supplying, family, sustainable and precise agriculture (Czyżewski & Kryszak, 2017). Under each of these concepts is a different way followed by people running agricultural holdings.

At present, a farmer is a person who combines knowledge about agricultural production, in particular cultivation, raising and breeding, with the knowledge in other fields, including the economy, accounting, banking, law or logistics. From the point of view of sustainable agriculture, it is important, for example, to constantly raise the knowledge of farmers in the field of environmental protection and the threats to the environment that agricultural production may cause.

A view prevails in the literature that sustainable agriculture is one that meets certain minimum values in three spheres: environmental (also called ecological), economic and social (Zegar, 2005). However, the subject of the discussion are not the mentioned spheres but the indicators that allow the farm to be included in the group of entities operating under sustainable agriculture. There is a lack of unanimity among the persons or institutions participating in this discussion on the aforementioned indicators. Using the value catalog proposed in the literature in relation to the environmental sphere, it can be assumed that it is a catalog of good agricultural practices, and therefore those that favor the environment, ideally allowing to preserve its wealth, or at least not harming it. (Tyburski, Szwejkowski & Glińska-Lewczuk, 2013) Regarding the economic sphere, it can be assumed that, on the one hand, the most important value is the income generated by a given entity dealing in agricultural production, and on the other hand the share of this production in the total agricultural production of the country. Among the features characterizing the social sphere, the literature mentions maintaining or increasing the economic viability of rural areas and using the economic potential (e.g. work) of the people living there.

Organic farming was the focus of this study. After finding arguments supporting the thesis that organic farming implements the idea of sustainable agriculture,

the authors will try to answer the question whether there are legal rules relating to organic farming, in particular those whose fulfillment allows the conversion of agricultural holdings from conventional to organic farming and operating as part of the processing of organic products. At the end, the authors will analyze the development trends of organic farming in Poland. The studied period falls on the years after the accession of Poland to the European Union and may be an interesting platform for comparative research.

2   Data and Methods

The research material relating to the part of this publication regarding Polish law are literature on the subject and the texts of legal acts of the European Union and Polish legislation dedicated to organic farming. This material has been analyzed using various rules and methods of statutory interpretation and evaluated. The research material relating to the economic part of this publication is secondary data and exactly published results of research carried out by entities dealing in organic production from 2004-2016 presented by Agricultural and Food Quality Inspection and literature on the subject. The collected data has been analyzed and presented in a descriptive, tabular and graphic form.

3   Results

3.1   Organic farming versus sustainable agriculture

On the basis of the general considerations included above regarding sustainable agriculture, the question should be asked whether organic farming is a part of the idea of sustainable agriculture.

The authors analyzing the impact of agriculture on the natural environment state that the relationship between agriculture and the natural environment is related to agricultural policy (in the case of the European continent in particular with the agricultural policy of the European Union) and the daily practice of people running agricultural holdings (Lockeretz, 2007). Funds for pro-environmental activities can only be covered by agricultural holdings defined by them as medium and large. The small and the largest agricultural holdings have problems in this matter, that is supporting the pro-environmental activities. The reasons for this situation are described in the literature as not entirely clear (Wrzaszcz, 2013). As indicated by the aforementioned authors, it is undoubtedly necessary to take two circumstances into account in this situation. A higher income can be achieved from better quality goods obtained thanks to pro-environmental

activities or from funds from the European Union, i.e. obtained from area payments invested in environmentally friendly activities.

The literature also claims that on ecological agricultural holdings, agricultural practices, which can be described as favorable to the environment are used on a daily basis. At the same time, one can find statements of the authors who put this claim in doubt. The reason for the inability to provide a clearly positive answer to this question is the fact that the relationship between the agricultural practice and its impact on the environment has not been unequivocally examined (Czyżewski & Kryszak, 2017). It has not been explicitly investigated, because it is impossible due to too many indicators to be taken into account in order to fully assess this relationship. After analyzing the external effects of agricultural production it can be concluded that the greatest pollution is caused by methane (related to animal production), nitrous oxide, ammonia and carbon dioxide emissions. Research shows that organic agricultural holdings emit less carbon dioxide per hectare. However, the emission of this gas per unit of agricultural production is comparable to the emission recorded in traditional agriculture (Stolze, Piorr, Häring & Dabbert, 2000). The results of other studies indicate that while the emission of nitric oxide in such farms is lower, the opposite is the case for methane (Troccoli, Maddaluno, Mucci, Russo & Rinaldi, 2015), which is produced more in organic agricultural holdings, which is probably associated with animal production.

Although the analysis of the subject literature does not allow to clearly state that organic farming definitely improves the condition of the natural environment, it also does not allow to formulate a statement that it harms or definitely harms it, and this leads to a conclusion that at this point they can be classified as sustainable agriculture.

Another problem that should be analyzed is the profitability of organic farming. This remains in connection with phenomena belonging to the social sphere. Polish consumers are becoming more and more aware of the features of healthy and good-quality food. Ecological products are gaining popularity year by year (Matysik-Pejas, Szafranska & Horska, 2017). They can be purchased at stationary and online stores as well as directly at agricultural producers. In view of the fact that consumer awareness is increasing, it should be assumed that the market for organic products will not diminish but will grow (Wasilik, 2014). Hence, it can be assumed that the income of the producers of organic goods, including processors, will not decrease and with high supply it will grow. The possibility of achieving regular income by persons conducting agricultural activity is another aspect of sustainable agriculture. It guarantees the implementation of the basic needs of people engaged in this type of manufacturing activity in agriculture, and further financial security and confidence. The acquired funds, in turn, allow various

social needs to be met or can be used to expand production and ultimately promote the very idea of organic farming.

3.2   Organic farming in the Polish legal system

Review of the literature

The idea of organic farming in Poland originated in the 1930s. In the period after the Second World War, this model of agriculture was not popular. Instead of "how it was produced", the "how much" was of more importance. The state was betting on the quantity rather than on the quality of the food produced. The interest in organic farming came with the political transformation in the 1990s. At that time, various circumstances were observed that could have contributed to the development of organic farming in Poland. One of them is the large labor force, while the others are the level of development of the economic sector, in which the level of fertilizer use was lower than in Western Europe, or the widespread belief in the beneficial effects of organic farming on the environment (Kowalska, 2010).

In the literature on the subject, it is recognized that one of the milestones in the development of organic farming in Poland was the creation of the EKOLAND Association. The statutory tasks of this entity included the promotion of organic farming. The next ground-breaking moments are the two regulations of the Minister of Agriculture and Food Economy from 1998 and 1999 respectively regarding subsidies for agriculture in relation to the costs of control of organic agricultural holdings and subject subsidies including subsidies to organic farming areas. It should be assumed that they appeared in the Polish legal system due to the European Agreement concluded in 1991 by Poland, that is the association agreement with the European Communities. At the end of the 1990s, 555 agricultural holdings used a certificate confirming their ecological character. And it has remained so to this day. Only the possession of a certificate entitles one to use the name of an organic producer and to put the appropriate logo on the products.

The first Act on organic farming originated in 2001 (Dz.U. 2001 nr 38 poz. 452) and its creation is connected with Poland's preparations for accession to the European Union, which took place on May 1, 2004. Prior to the accession, Poland undertook to adapt its domestic law to the European Union law. Due to the fact that agriculture (therefore also organic farming) is one of the pillars of the common European market, it remains in the direct interest of the European legislator (Willer & Lernoud, 2017). Therefore, the Act of 2001 took into account Council Regulation (EEC) No 2092/91 on organic farming and the labeling of its products and foodstuffs. The regulation became part of Polish law on May 1, 2004. From then, Polish farmers may apply for subsidies to the area of organic farming as part of the Rural Development Programme (RDP) as well as to include a Community

mark on their products confirming that a given product is an ecological product. On the other hand, Polish organic goods may have been exported to other Member States of the Community without any problems since May 1, 2004 due to the fact that the European Commission recognized Polish certificates of organic farming (Kowalska, 2010). Statistical data, which will be presented later in this study, covers the period from 2004 to 2016. The most intensive development of organic farming in Poland is noted for the years 2007-2013. In 2007, Council Regulation (EC) No 834/2007 came into force in the law of organic production and labeling of organic products. It replaced the abovementioned Council Regulation (EEC) No 2092/91. Regulation 834/2007 was in turn amended, among others by Council Regulation (EC) No 967/2008. Commission Regulation (EC) No 889/2008, which lays down detailed rules for the implementation of Council Regulation (EC) No 834/2007 and has been amended by two Commission Regulations (EC) No 1254/2008 and 710/2009, together with our national Action Plan for ecological food and organic farming for the years 2007-2013 contributed to its significant development. As it will be presented below, it was in these years that organic farming developed most intensively and its best results were achieved exactly in 2013. Commission Regulation (EC) No 1235/2008 is devoted to the issue of importing organic products from third countries, which constitutes detailed rules for the implementation of Regulation 834/2007. In the meantime, in 2009, the Polish legislator passed a new Act on organic farming (Dz.U. 2009 nr 116 poz. 975). This act is supplemented by numerous executive acts. With reference to the EU perspective of financing agriculture covering the years 2014-2020, it is worth mentioning the Regulation of the European Parliament and the Council (EU) No 1307/2013 regarding direct payments to farmers on the basis of support schemes under the Common Agricultural Policy (CAP), which provides for the institution of greening. This is one of the objectives of the CAP, for which one can obtain funds under direct payments. The aforementioned regulation also provides for payment for agricultural practices beneficial for the climate and the environment (i.e. diversification of crops, maintenance of an existing permanent grassland and maintenance of an ecological area on farmland) or equivalent practices (Leśkiewicz, 2015). In turn, Regulation (EU) No 1305/2013 of the European Parliament and of the Council concerning support for rural development by the European Agricultural Fund for Rural Development (EAFRD) refers, among others, to quality systems through the regulation of farm certification as well as payments to maintain organic farming and conversion to organic farming.

Results

The above mentioned calculation shows how many legal acts should be taken into account in order to build a legal norm aimed at regulating a specific issue within the framework of organic farming. For ease, it should be assumed that the reading of the regulations should start from the sources of EU law, and the national provisions should be applied secondly (Rolnictwo ekologiczne, 2009). The key document is Council Regulation (EC) 834/2007. Its explication is provided in the Commission Regulation (EC) 889/2008, and the details regarding Poland as for today are defined within the Act on Organic Agriculture and RDP 2014-2020 (RDP, 2014). The law defines the objectives, principles and rules of organic production in a very general way. The objectives, principles and rules apply to plant and animal production, care for soil, fertilizers and plant protection products. The principles of organic farming include production conducive to the sustainable exploitation of resources, total abandonment of genetically modified organisms, use of measures other than external resources and non-use of means derived from chemical synthesis.

Entities interested in conducting manufacturing activities as part of raising, breeding and organic farming are required to obtain a special certificate. It is awarded by the certification bodies over which the supervision is carried out by the Agricultural and Food Quality Inspection (www.ijhar-s.gov.pl). Thanks to this practice, we have accurate data on the number of entities that can be identified as organic producers. Starting a business may refer both to entities that have not yet conducted production activity in agriculture, as well as those that carried out the activity, but the production took place with the use of products not allowed in organic production and are ready to abandon their use and submit to the control system as well as those that only partially deal with organic production. The resetting step is called the conversion step. Special case are the situations where the law permits the so-called derogations from the organic production rules. Most often they relate to the stage of conversion of production from conventional to organic, and may be caused by climate, geographical location or due to structural issues (Rolnictwo ekologiczne, 2009). However, the opinion of the certification body is indispensable in this case.

3.3   Organic farming in the Poland – an economic view

The basis for the following part of a paper is statistic data presented by Agricultural and Food Quality Inspection.

As shown in the statistics below (Figures 1, 2 and 3), organic farming in Poland grew stronger from the beginning of the process of political transformation, with the most dynamic development stage falling in the years 2004-2013. In 2013, the number of organic producers was the highest in history, with the agricultural

producers being understood as two groups of producers, namely organic agricul-tural producers (Figure 2) and organic entities involved in the preparation (Fig-ure 3), i.e. organic product processors, organic food importers, beekeepers and fishermen engaged in aquaculture.

Figure 1 **Number of organic producers in Poland in 2004-2016**
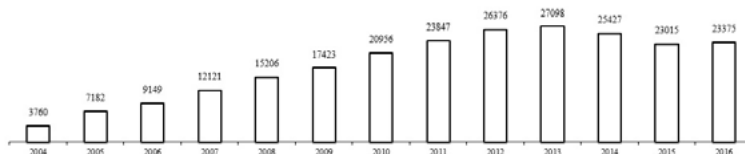
Source: www.ijhar-s.gov.pl.

The constant increase in the number of organic agricultural producers was observed in 2004-2013. The year 2014 was the first year in which the number of organic agricultural holdings was lower than in the previous year. Detailed data (not included in this study) allows us to state that in the indicated period some producers withdrew from such production, with the largest extent being in the Małopolskie (456 entities), Podkarpackie (269 entities) and Świętokrzysk-ie (212) provinces. It is interesting insofar as in these voivodeships (territorial division units of Poland) predominate the so-called small agricultural holdings, i.e. agricultural holdings with a small area of up to 5 ha, for which conversion from conventional to organic production is often treated in the literature and by agricultural advisors as an opportunity to preserve production, or relatively to develop the business, as well as to increase profitability.

Figure 2 **Number of organic farmers in Poland in 2004-2016**
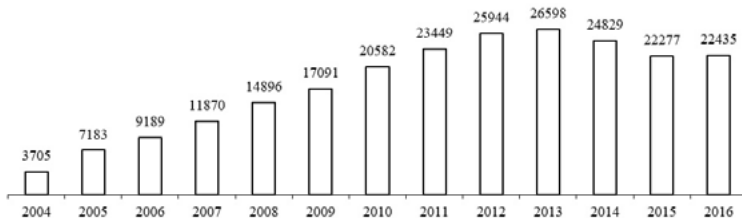
Source: www.ijhar-s.gov.pl.

As mentioned above, the group referred to as organic entities involved in the preparation is in a decided minority and, what is more, it constitutes

a heterogeneous group, as it brings together entities operating in various fields. What is interesting is that since 2004 this group is constantly growing. A particularly high increase in the number of entities involved in the preparation has been recorded since 2013.

Figure 3 **Number of organic processors in Poland in 2004-2016**
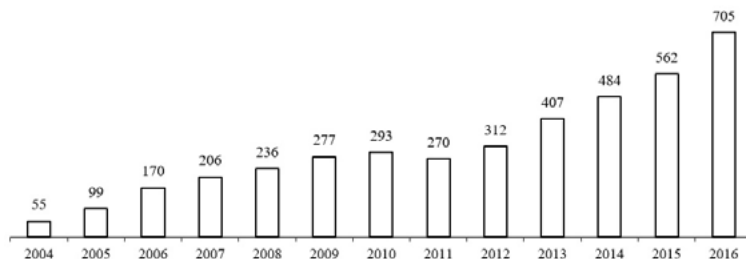
Source: www.ijhar-s.gov.pl.

The next issue that should be analyzed is the number of agricultural producers in individual voivodships. Poland is divided into 16 provinces. The provinces with fragmented agriculture are: Małopolskie, Podkarpackie, Świętokrzyskie and Śląskie. As shown in Figure 4, organic producers dominate in provinces in which the agriculture is not fragmented.

Figure 4 **The number of organic producers by voivodships in Poland in 2016**
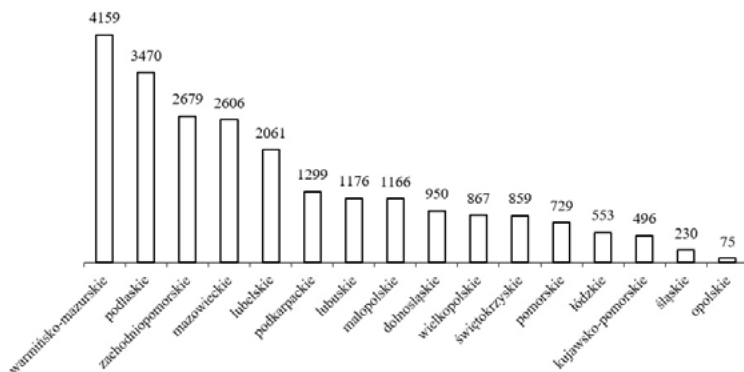
Source: www.ijhars.gov.pl.

Analyzing the share of organic producers from individual provinces in their total number in 2016 (Figure 5), it can be stated that half of the organic producers, or exactly 55%, are producers from provinces where medium and large agricultural holdings dominate. In the provinces where the small agricultural holdings dominate, the production is run by 16.6% of the total organic producers.

Figure 5 **The share of organic producers in relation to total number of organic producers in Poland in 2016** [%]
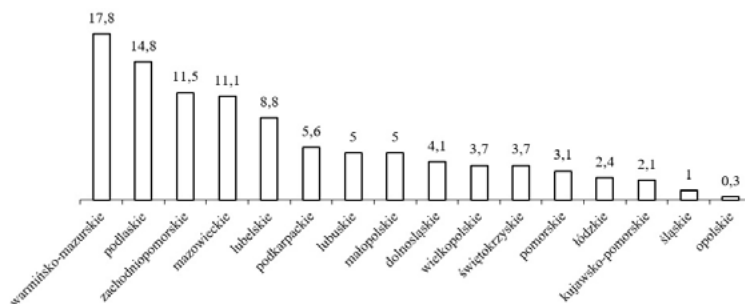
Source: www.ijhar-s.gov.pl.

The data collected in the years 2004-2016 allows us to observe the changes in the area designated for organic production (Figure 6). An interesting relationship can be noticed here, namely a decrease in the area covering organic production. Since 2014, year to year, the area dedicated to organic production has diminished. And although the number of organic producers is increasing, this is not accompanied by an increase in the area of ecological arable land. The first conclusion is that it is probably related to the increase in the number of entities involved in the preparation. Another reason may be that although the number of agricultural holdings conducting organic production is increasing, they are so small that the sum of their area does not result in an increase in the total area of agricultural land allocated for organic production.

Figure 6 **Agricultural area under organic farming in Poland in 2004-2016 [ha]**
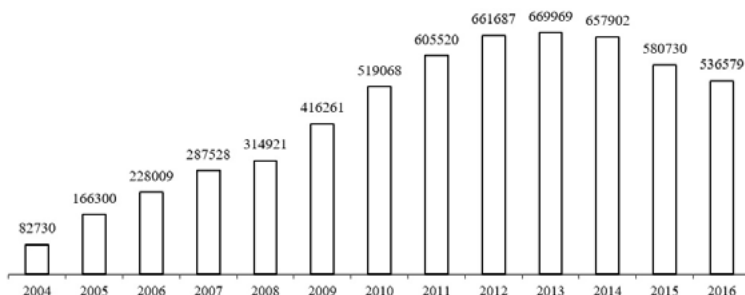
Source: www.ijhar-s.gov.pl.

The relationship described above can be analyzed based on the data presented below (Table 1).

Table 1 **Structure of the area under organic farming in 2015-2016**

Area	2015 number	2015 share [%]	2016 number	2016 share [%]
> 5 ha	3176	14,3	4535	20,3
5-10 ha	5024	22,5	4570	20,4
10-20 ha	6350	28,5	5917	26,5
20-50 ha	4736	21,3	4653	20,8
50-100 ha	2016	9,0	1878	8,4
< 100 ha	975	4,4	816	3,6
Total	22277	100,0	22369	100,0

Source: www.ijhar-s.gov.pl.

While in 2015, the agricultural holdings with an area of 10-20 ha were in the lead among organic agricultural holdings, in turn in 2016, it was the agricultural holdings with an area of up to 5 ha that became the leaders. This indicates some transformations, maybe a change in the thinking of operators of small agricultural holdings. The data may also indicate that it is profitable for people running small agricultural holdings to join the group of organic producers. However, the correctness of these conclusions will be confirmed or not in the future when the statistical data for 2017 is made available.

As shown by the presented statistical data, the breakthrough year was 2014, when both the number of organic producers and the area of agricultural area under organic farming began to decline. In connection with this tendency, it is

worth considering its causes. In particular, it is worth to analyze whether this dependence is not related to the fact that in 2014 a new multiannual financial framework for agriculture began. The analysis of the Polish RDP for the years 2014-2020 (RDP, 2014) shows that the agri-environmental schemes are different than in Polish RDP for the years 2007-2013 (although it should be noted that a precise analysis of differences of this two RDPs in this paper is not possible). For example the access to agri-environmental schemes is related to the obligation to have animals. Organic farmers who do not have animals (who cultivate fodder plants or orchards) have given up organic farming instead of changing their production profile. This allows to presume that an important reason why some farmers have resign from organic farming after 2013 was Polish RDP 2014-2020.

4   Conclusion

The above considerations lead to the conclusion that organic farming, taking into account its impact on the natural environment, the social and economic spheres of their operators, is part of the idea of sustainable agriculture.

The above review of the legislation allows us to state that the European legislator is interested in organic farming. The proof are the legal acts that are created, changed and updated, as well as the priorities of the Common Agricultural Policy. The legislator not only notices that organic farming has a positive impact on the environment and for this reason they promote it, but they also are aware of what problems organic producers may face and the importance of such mechanisms as quality systems and their control, or the financial support aimed at conducting information and promotion activities that allow consumer acquisition.

The data presented above allows us to state clearly that significant changes in the state of organic farming occurred with the accession of Poland to the European Union and access to argi-environment payments. Organic farming is undoubtedly gaining popularity among both the producers and the consumers of organic products.

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FACTORS INFLUENCING STRATEGIC APPROACH TO TALENT MANAGEMENT OF COMPANIES IN SLOVAKIA

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Abstract

People in the companies play strategic role. Only high quality people named as the talents can create new values and lead company towards meeting the strategic goals. Talent management became a key component to business success in the current conditions. In our research we wanted to clarify importance of strategic approach in the talent management because whole talent management process must be in harmony with strategic orientation of the company represented by strategic ideas and objectives. In our research we verified the factors which influence talent management in companies in Slovakia. 381 companies were included to the research. Questionnaire with nine items and four classification questions was used as a tool for data obtaining. In all items Likert scale 1-5 was used. We identified several statistically significant differences using parametric test (ANOVA). To consider results as robust we used also nonparametric tests (Kruskal – Wallis and Mann – Whitney). Economic results are the most influential factor of talent management. We identified even eight significant differences according to this criterion. Companies with better economic results have strategic approach to talent management on higher level compared to companies with worse results. Another factor that greatly influences the strategic concept of human resources is the allocation of foreign capital in the enterprise. Businesses with foreign capital allocation have better strategic approach to talent management.

Keywords: *talent, management, strategy, company, factors*

JEL classification: *M10, M12, M14*

1   Introduction

People are the most valuable source in each company. Capital and material are also important but only human power can create added values for competitiveness. Therefore focus on human resources is still very actual in academic sphere but also in practice. Talented individuals play important role in this system. Thus, talent management is a strategic question of companies to create competitive advantage on the market. That is the reason and motivation to write this paper.

Talent management process must be connected with business strategy and human resources strategy. It is the starting point which is followed by identification of talent and recruitment, assessment of the talents, their development, and retaining. Our paper is focused on this starting point – strategic approach of talent management. We would like to clarify some relationships between talent management and strategies used in companies. We tried to verify if strategic approach of the talent management is determined by the factors such as a size of the company, allocation of foreign capital, economic results, and existence of HR unit in organizational scheme.

1.1   Strategy and Talent Management

Valverde et al. (2013) claim that human resources management is strategic process which helps to build workforce and reach good organizational results. Talent management presents strategic ideas to leadership succession processes using the employee lifecycle model. Talent management as an interest of researchers has become an important area (Ashton and Morton, 2005 and Sparrow et al., 2004). Talent management can be defined as a systematic and dynamic process of discovering, developing and sustaining talent (Egerová et al. 2015). Armstrong (2006) adds that talent management should not only focus on the high-flyer, but it should concern all other efficient workers. Talent management is a new trend of human resources management likely to challenge many traditional management practices (Skuza, Scullion & McDonnell, 2012). It brings a pressure to create new tools, methods and processes in HRM to provide the necessary co-ordination systems. (Kim, Park, & Prescott, 2003).

The talent of individual employees is a unique source of competitive advantage and involves a central element of strategic human resources policy in recent years (Frank and Taylor, 2004; Holátová et al., 2014; Březinová, 2014; Lewis and Heckman, 2006). Talent management became important strategic question. Strategic talent management includes activities and processes that involve the systematic identification of key positions which differentially contribute to the organisation's sustainable competitive advantage. It can help to develop a talent pool of

high potential and high performing incumbents to fill these roles. It is also useful tool of development in a differentiated human resource architecture to facilitate filling these positions with competent incumbents to ensure their continued commitment to the organisation (Collings and Mellahi, 2009).

2   Data and Methods

Methods and ways of the research are described in this section. Selective survey was used as a method for data collection. It means that the chosen data are only part of the basic file and therefore the accuracy of the results is limited. (Munk, 2013). A scaled questionnaire was used as a tool of collection that contained 9 items focused on the strategic approach of talent management. Strategic approach was a part of the complex questionnaire (41 items) designed by academics from Slovakia, Czech Republic, Hungary, and Poland. Questionnaire contains also other classification items such a size of the company, economic situation, foreign capital, and existence of HR department in the company. Here is the list of the items with marks used in the paper.

Table 1 **List of the items and their marks**

I 1	*Talent management is essential for the company*
I 2	*Talent management is an important part of the corporate mission*
I 3	*Top management worked out a joint attitude towards talent management*
I 4	*HRM strategy is clearly defined*
I 5	*Talent management strategy is clearly defined*
I 6	*Talent management strategy is connected with strategic goals of our organization*
I 7	*We are currently modifying the list of key talents in our company*
I 8	*We search for talent in every single person that has just been employed*
I 9	*Formulated talent management strategy is not difficult to realize in our company*

Source: Own processing according to questionnaire.

The items of the questionnaire were scaled according to Likert from 1 to 5, where 1 means absolute disagreement of the respondent, 5 means absolute consensus and Figure 3 expressed irresolute attitude of the respondent. We added also Figure 0 enabled the respondent not to comment on a given item. The questionnaire was distributed electronically via online form. This questionnaire was created by group of scientists collaborated on common project and it was used in papers of scientific journals (Egerová et al., 2013).

Reliability of the questionnaire was verified by means of Cronbach´s alpha. According to Nunnally and Bernstein (1994) the evaluation of scales is based on examining the correlations between the individual items or measurements in relation to the variability of the items. The values of Cronbach´s alpha higher than 0.7 shows on sufficient scale consistence. In our case Cronbach´s alpha reached level 0.864.

We formulated following research hypothesis and questions:
– Hypothesis No. 1: The strategic approach of talent management is determined by the size of the enterprise.
– Hypothesis No. 2: The strategic approach of talent management is determined by the foreign capital allocated in the company.
– Hypothesis No. 3: The strategic approach of talent management is determined by the economic results of the company.
– Hypothesis No. 4: The strategic approach of talent management is determined by existence of any unit focused on human resources.

Existence of statistically significant differences between individual groups of respondents were tested by ANOVA (parametric test). For the purposes to declare robust of the results nonparametric tests such Kruskal-Wallis test and Mann-Whitney test were used.

3   Results and Discussion

This paper is focused on the problem how strategic approach of talent management is used in companies in Slovakia. We tried to compared companies divided according to criteria such a size of the company, existence of foreign capital in the enterprise, economic situation and existence of human resources unit in the enterprise. This quantitative research study was conducted between June 2013 and December 2016. Research sample contains 381 companies which run business in Slovakia. In the determinant size of the enterprise, the intervals were set according to the EU´s enterprise size typology (see Table 2). Each enterprise was represented by owner, or employee responsible for human resource management.

Table 2 **Size of the enterprise**

		Frequency	Percent
Valid	small (10-49 employees)	181	47.5
	medium (50-249 employees)	113	29.7
	large (250 and more employees)	85	22.3
	Total	379	99.5
Missing		2	0.5
Total		381	100.0

Source: Own processing.

According to factor of existence of foreign capital the structure is following. In 57.7% of searched enterprises the foreign capital is allocated and 41.7% of enterprises have only Slovak capital. Two respondents are missed because they did not fill this classification question (see Table 3).

Table 3 **Foreign capital in the enterprise**

		Frequency	Percent
Valid	yes	159	41.7
	no	220	57.7
	Total	379	99.5
Missing		2	0.5
Total		381	100.0

Source: Own processing.

According to next criterion – economic results we have in the research sample 41.7% companies without economic change in the last year. 9.4% of companies show worse and 48.3 better economic results in the last year (see Table 4).

Table 4 **Economic results in the enterprise**

		Frequency	Percent
Valid	without change	159	41.7
	worse	37	9.4
	better	184	48.3
	Total	288	100.0

Source: Own processing.

Table 5 shows that there are 62.2% of enterprises where is any organizational unit focused on human resources management (department of human resources management, or supervisor for human resources). On the other hand, there are 37.5% of companies without any organizational unit of human resources management in our research sample. In these enterprises, there is no organizational rule that take care of human resources management. Usually it is provided by owner or randomly by any person.

Table 5 **Existence of HR unit in the enterprise**

		Frequency	Percent
Valid	yes	237	62.2
	no	143	37.5
	Total	380	99.7
Missing		1	0.3
Total		381	100.0

Source: Own processing.

Table 6 shows selected descriptive statistics of searched items. There we can see that respondents have the highest tendency to agree with the item I1 where declared the fact that talent management is essential for the company. Contrary, the lowest tendency to agree was recorded in item I9 referring to the problems caused with implementation of talent management strategy.

Table 6 **Descriptive statistics of the items**

	Count	Median	Modus	Average	Standard deviation	Variance
I1	372	4	4	3,66	1,055	1,114
I2	374	4	4	3,43	1,073	1,152
I3	357	4	4	3,43	1,101	1,212
I4	373	4	4	3,58	1,116	1,244
I5	364	3	3	2,96	1,105	1,222
I6	361	3	3	3,04	1,121	1,257
I7	346	3	3	2,86	1,145	1,310
I8	372	4	4	3,55	1,177	1,385
I9	361	2	2	2,51	0,995	0,990

Source: Own processing.

In Table 7, there are average points in individual categories shown. These numbers helped us to identify differences in attitudes of individual groups.

Table 7 **Average points in categories of the companies**

		I1	I2	I3	I4	I5	I6	I7	I8	I9
size of enter-prise	small	3,61	3,39	3,36	3,31	2,74	2,93	2,65	3,55	2,45
	medium	3,68	3,41	3,42	3,68	3,03	3,10	3,06	3,54	2,43
	large	3,73	3,52	3,59	4,05	3,33	3,22	3,07	3,58	2,69
foreign capital	with foreign capital	3,75	3,53	3,61	3,95	3,29	3,34	3,13	3,56	2,62
	without foreign capital	3,60	3,35	3,30	3,31	2,72	2,83	2,67	3,54	2,42
eco-nomic results	better	3,89	3,62	3,68	3,79	3,11	3,22	2,96	3,73	2,60
	without change	3,41	3,24	3,30	3,45	2,92	2,95	2,80	3,43	2,50
	worse	3,51	3,25	2,74	3,08	2,39	2,51	2,58	3,19	2,11
HR de-partment	yes	3,72	3,48	3,59	3,89	3,14	3,19	3,05	3,61	2,54
	no	3,56	3,33	3,16	3,06	2,67	2,81	2,56	3,46	2,47

Source: Own processing.

Based on the first factor (enterprise size), three statistically significant differences (shown in Table 8 – I4, I5 and I7), were identified using ANOVA and Kruskal-Wallis test. Both identified the same differences and therefore results may be considered robust. At the same time, these differences were subjected to a multiple comparison for the identification among which groups of enterprises these statistically significant differences were formed. Based on the averages, an evaluation was made, in favour of which groups the differences occurred.

Table 8 **Verification of the differences – size of the enterprise (ANOVA and Kruskal-Wallis)**

	I1	I2	I3	I4	I5	I6	I7	I8	I9
Mean Square	0,413	0,548	1,372	15,975	10,097	2,404	7,270	0,034	1,869
F	0,370	0,475	1,133	13,867	8,586	1,918	5,666	0,025	1,923
p value (ANOVA)	0,691	0,622	0,323	0,000	0,000	0,148	0,004	0,976	0,148
Chi-Square	1,538	1,534	2,577	26,923	16,568	3,632	11,063	0,287	3,603
p value (KW)	0,463	0,464	0,276	0,000	0,000	0,163	0,004	0,866	0,165

Source: Own processing.

In item I4, it was investigated whether there is human resource management strategy clearly defined in the company. A statistically significant difference between small, medium and large enterprises was found in this item (differences between all groups were found). We consider that in large companies, the level of human resource strategy definition is higher than in small and medium-sized enterprises. This is in particular because small businesses are not empowered to develop such a strategy, so there is no human resources strategy. In small businesses there are multifunctional people who do a lot of work and therefore there is no human resources specialist whose job was to clearly define and subsequently implement the human resources strategy. For the same reasons, is not defined any talent management strategy, which should be a natural part of the human resources strategy, in small businesses. This difference has been identified in I5 and exists only between a group of small and large enterprises. Another statistically significant difference was also found in item I7, which focused on whether the list of talents needed for the company's future is being modified at present. We see the difference only from the point of view of small enterprises, compared to the medium and large businesses. Medium and large businesses, modify the need for talented individuals depending on the external environment.

The foreign capital in the enterprise has a significant impact on the formulation of the company's human resources strategy. Even 5 statistically significant differences in the survey items were identified. These were items I3, I4, I5, I6 and I7 (highlighted in Table 9). The difference found in I3 identifies the difference in top management behaviour to talent management. We consider that in enterprises with foreign capital, top management has a common position on talent management, which has an impact on the formulation of a strategy in this area. These businesses have experience from talent management abroad and can assess the necessity of a system that integrates talent management into managerial work. Conversely, there is no such experience in an enterprise where there is no foreign capital and therefore often top executives do not have a clear view of talent management. Top management is not so enthusiastic to support promoting the idea of implementing talent management. Items I4 and I5 confirm the existence of a clearly defined strategy for human resources management and talent management. Statistically significant differences were found in these items, and it can be concluded that in enterprises with foreign capital the human resources strategy and talent strategy is an irreplaceable part of the strategic management process. Other statistically significant differences identified in I6 and I7 indicate that in ventures with foreign capital, the talent management strategy is better linked to the organization's strategic goals and reflects the need for future talent in the

company, compared to companies without foreign capital. Also nonparametric test was also performed on the data to confirm the robustness of the results.

Table 9 **Verification of the differences – foreign capital (ANOVA and Mann-Whitney)**

	I1	I2	I3	I4	I5
Mean Square	2,181	2,784	7,963	36,627	29,343
F	1,955	2,417	6,644	31,755	25,509
p value (ANOVA)	0,163	0,121	0,010	0,000	0,000
Mann-Whitney U	15418,0	15186,0	13063,0	11284,0	11280,0
p value (MW)	0,178	0,082	0,014	0,000	0,000

	I6	I7	I8	I9
Mean Square	22,158	17,340	0,023	3,655
F	18,473	13,642	0,016	3,706
p value (ANOVA)	0,000	0,000	0,898	0,055
Mann-Whitney U	11713,5	11080,5	16518,0	14053,5
p value (MW)	0,000	0,000	0,836	0,062

Source: Own processing.

Regarding the factor of economic results we can see statistically significant differences almost in all items (beside I7, see table 10). In order to find out which groups of enterprises generated statistically significant differences, multiple comparisons were used. It can be said that companies with improved economic performance compared to companies with worse economic results in larger extent:
- Have top management with a common attitude on talent management (I3).
- Have a clearly defined strategy on human resources management (I4).
- Have a clearly defined talent management strategy (I5).
- Have a talent management strategy linked to the strategic goals of the organization (I6).
- Are currently modifying the list of talents needed for the company's future (I7).
- Looking for talent in every newly recruited person (I8).
- Consider talent management strategy workable under their conditions (I9).

At the same time, companies with improved economic results compared to companies with unchanged economic results are more likely to:
- Consider talent management to be extremely important (I1).
- Talent management is an important part of the business mission (I2).

- Their top management has a common attitude on talent management (I3).
- Have a clearly defined strategy for human resource management (I4).

Differences can also be seen between enterprises with unchanged economic results and enterprises with worse results. These are two items I3 and I5. Companies with unchanged economic results have a higher level of leadership that has a common attitude to talent management (I3) and have a clearly defined talent management strategy (I5). Also nonparametric test (Kruskal – Wallis) was performed on the data to confirm the robustness of the results.

Table 10 **Verification of the differences – economic results (ANOVA and Kruskal-Wallis)**

	I1	I2	I3	I4	I5	I6	I7	I8	I9
Mean Square	9,796	6,732	14,923	9,840	8,065	8,301	2,430	6,147	3,456
F	9,198	6,020	13,155	8,198	6,795	6,820	1,858	4,511	3,556
p value (ANOVA)	0,000	0,003	0,000	0,000	0,001	0,001	0,158	0,012	0,030
Chi-Square	18,162	13,955	24,477	14,479	13,326	11,944	4,304	10,234	6,144
p value (KW)	0,000	0,001	0,000	0,001	0,001	0,003	0,116	0,006	0,046

Source: Own processing.

Based on the differences found, we consider that companies with better economic results will also determine a higher level of formulation and implementation of the human resources strategy integrated into the corporate strategy. It may, however, be assumed to be the opposite. Businesses with a formulated human resources strategy and talent strategy have better economic results.

Existence of HR unit is last searched determinant of talent management process in our research. Businesses with a human resources unit in the organizational structure have a significantly higher tendency to agree with the items connected with the strategy of human resources, and it is therefore possible to consider that a strategic focus on human resources is at a higher level than in enterprises, where there is no organizational unit focused on human resources. Five statistically significant differences were found (in items I3, I4, I5, I6, and I7, see table 11).

Table 11 **Verification of the differences – existence of HR unit (ANOVA and Mann-Whitney)**

	I1	I2	I3	I4	I5
Mean Square	2,071	2,014	15,639	59,065	18,583
F	1,867	1,757	13,353	54,159	15,789
p value (ANOVA)	0,173	0,186	0,000	0,000	0,000
Mann-Whitney U	15006,0	14979,5	11987,0	9724,0	11750,0
p value (MW)	0,240	0,180	0,001	0,000	0,000

	I6	I7	I8	I9
Mean Square	12,566	20,090	1,772	0,359
F	10,257	15,953	1,277	0,363
p value (ANOVA)	0,001	0,000	0,259	0,547
Mann-Whitney U	12611,5	10763,5	14922,5	14870,0
p value (MW)	0,002	0,000	0,167	0,691

Source: Own processing.

Organizations in which human resources specialists are grouped into one unit have better prerequisites for talent management implementation, as senior management sees the importance of talent management (I3) and integrates this into the human resources strategy and talent strategy (I4, I5) and are able to link this strategy with the goals and vision of the business operations (I6). At the same time, they are currently trying to adjust the talent list for the future (I7). The data were subjected to nonparametric test, where statistically significant differences were identified in the same items, so the results can be considered robust.

4   Conclusion

The human resources strategy, which implements the talent strategy, must be closely linked to business strategy. This link creates a good premise that human resources will be a priority in the development of a business while ensuring a higher value for society. From the results it can be seen that the most significant factors influencing this phase are the economic results of the company. It can be said that in companies with improved economic results there is a better linking of strategies with emphasis on talent development. Another factor that greatly influences the strategic concept of human resources is the allocation of foreign capital in the enterprise. Businesses with foreign capital allocation have better strategic

approach to talent management. This is mainly related to the higher strategic orientation of foreign companies which can transfers their know-how to our businesses as well. Referring to the hypothesis set in the research we can conclude that all hypotheses were verified because we found 3 statistically significant differences which were influenced by size of the company, 5 by foreign capital, 8 by economic results, and 5 by existence of HR unit.

To improve the awareness of the strategic impact of human resources in enterprises, top management must have a clear attitude towards talent management. We propose to develop a clear structure of long-term human resources management objectives based on the company's mission and corporate goals. In particular, it sets out strategic goals (such as reducing fluctuation, increasing labour productivity, increasing employee satisfaction, optimizing the human resources structure, etc.) leading to an increase in the quality of human resources and consequently to achieve better economic performance in the enterprise. We also recommend regularly modifying lists of talents and requirements for them in view of the ever changing external environment.

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ARE COMPANIES WITH DIFFERENT CORPORATE CULTURE REALLY DIFFERENT? THE CASE OF SLOVAKIA

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Abstract

Corporate culture is a term commonly used abroad as an indication of principles, values, rules and behaviours that are creating the essence of organization. However, in Slovakia it is a phenomenon that it slowly adapts to academic level and even slower in business practice. Article deals with the corporate culture of Slovak companies. The attention is paid to the type of corporate culture model and consequently selected factors are examined such as (the field of business, company size and residence region of maternity company) which influenced the type of corporate culture. For categorization of corporate culture commonly very good known Perlmutters EPR theory is used. This was applied on the sample of 145 companies which are single business entities in Slovakia, though they are somehow connected with at least one foreign company (as subsidiaries, affiliations, franchises, ect.). This connection is a prerequisite for examining a relationship between the culture of maternity and daughter company and therefore for application of selected types of corporate culture.

Keywords: *corporate culture, factors, company size, internationalization, Slovakia*

JEL classification: *D64, F23, L26*

1 Introduction

Corporate culture is not a very familiar term in the practice of Slovak enterprises. It has arguably always been important, but even in the developed countries, it's only become a popular point of discussion in the past 20 years (Alton, 2017). In Slovakia, it is a phenomenon that it slowly adapts to academic level and even

slower in business practice. We do not want to consider Slovak companies as a vivid in corporate culture. Unfortunately, in our country it is very common that the corporate culture is applied without the target as a natural part of the business. In addition, corporate culture as a term is little known in company practice.

Corporate culture means the pervasive values, beliefs, and attitudes that characterize a company and guide its practices (Rouse, 2013). It means the principles and behaviours that permeate organization are the essence of culture. While it's not easily defined, culture is a living, breathing aspect of the business that develops and changes as they grow. It also extends to how they work with customers and partners and even how stakeholders and potential hires perceive them (McClain, 2017). Culture represents the unspoken code of communication among members of an organization (Cremer, 1993). A related view is that culture is a convention that helps coordination, like which side of the road we drive on (Guiso, Sapienza and Zingales, 2014). The managerial literature focuses on the notion of culture as "a set of norms and values that are widely shared and strongly held throughout the organization" (O'Reilly and Chatman, 1996). According to Shein (2015) it is the learned outcome of a group's solving its problems of external survival and internal integration.

The benefits of a strong corporate culture are both intuitive and supported by social science (Coleman, 2013). Alton (2017) adds that there are clear benefits to having a strong, unified company culture underlying the business's operation. Coleman (2013) states that there are six main elements of corporate culture: Vision, Values, Practices, People, Narrative, and Place. On the other hand, some authors reported four main components such as Ubrežiová et al., (2015): Values, Heroes, Rituals, and Symbols.

2   Data and Methods

Paper represents the part of the research focused on the Corporate social responsibility and related topics at Slovak business environment. The sample includes data of 145 companies. These all are individual business entities operating in the Slovak Republic, simultaneously connected with at least one foreign business entity which operates out of Slovak territory. Examined companies are subsidiaries of foreign companies which, in the internationalization of their business activities, penetrated the Slovak market. This characteristic is very important due to fact, that pure Slovak companies are considered as not sufficiently focused on corporate culture issues. The connection of the examined companies with the international business environment was a prerequisite for dealing with the corporate culture. Therefore, this research does not have to answer the question of whether or not the enterprises under study deal with business culture. Vice versa, only enterprises that implement

the corporate culture are involved in this research. The goal was to describe selected aspects of the implementation of corporate culture in Slovak companies. Data collection was carried out in 2017 in the form of structured interviews conducted by trained interviewers. Each subject was physically visited and answered by his authorized representative. Paper based on the findings of what type of corporate culture (which model) chosen by the examined companies enter the Slovak market. Consequently, attention is paid to the deepening of the characteristics of these companies such as focus on their business interest, residence region of their mother company and their economic size. We consider these three characteristics as essential for choosing an appropriate corporate strategy with respect to culture. Considering different approaches of multinational companies regarding respect of the culture of maternity company and/or daughter company we used Perlmutter model.

3   Results and Discussion

In the process of internationalization, companies which carried out business activities in more than one country have had to focus on the question of the cultural dominance. When invested in the foreign country with similar political, economic and religious background it was easy to assert the same culture (rules, habits, values, ect.) as in the domestic country. The problem usually occurs in cultural distant countries (which used to be also geographical distant) in which it was not possible to apply the same habits and values. As a result of these discrepancies, multinational companies in different subsidiaries have begun to apply different approaches to promoting corporate culture.

Figure 1 **Applied strategies of corporate culture enforcement in examined companies**
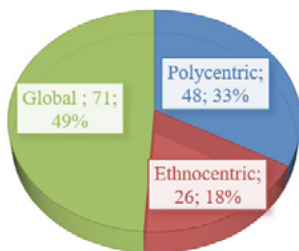
Source: Own research, 2017.

This article is based on the theory of Howard Perlmutter, who examined this phenomenon and for categorization of different approaches, he developed the

model, well known as EPR model. Model based on the presumption, that the organization's strategy could be influenced by three factors (Perlmuter, 1969): ethnocentrism, polycentrism, or geocentrism in the international environment

According to our research, Figure 1 shows the choices of companies in strategies of corporate culture enforcement. Most of the examined companies (49%) follow the global strategy, 33% of companies choose the polycentric strategy and 18% adhere ethnocentric strategy. This shows that most companies want to create a single corporate culture, regardless of the culture in which the mother and subsidiary companies are located.

Ethnocentric Corporate Culture

Companies choose ethnocentric strategy in international business when they are trying to keep strong influence of the maternity company and culture of hers country. Usually the main goal of entering foreign market is to increase profit of maternity company and every international functional units (such as research and development, marketing, finance, ect.) are primarily carried out with the needs of the home country. This type of strategy is suitable for companies that will not need a higher degree of adaptation to local conditions and local consumer habits. Successfully it is implemented mostly at geographically and culturally close markets. The degree of autonomy of foreign subsidiaries is low and key management positions are occupied by people from the home country. Even though it looks like it is very simple to implement this strategy, but there are some risks associated with it. The problem can be with the behaviour of the customer or the cultural adaptability of managers and their families, understanding local customs and traditions at foreign market. However, if the cultures of the home country and the host country are incompatible, the implementation of this strategy is not applicable as it would create strong conflicts.

Figure 2 **The business focus of entities applying an ethnocentric model of corporate culture**
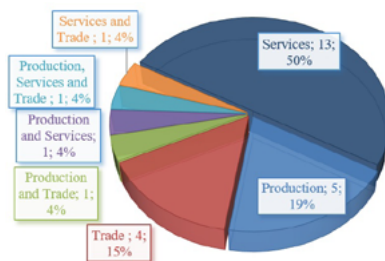
Source: Own research, 2017.

Figure 2 shows that half of the companies that chose the ethnocentric model of corporate culture are operating in the service sector. 19% of the sector is occupied by companies in the production area. Trade branch occupies 15%. Only one company from other spheres (services and trade, production, services and trade, production and services, production and trade) follow the ethnocentric model of corporate culture in their business.

Figure 3 **The residence region of maternity company of entities applying an ethnocentric model of corporate culture**
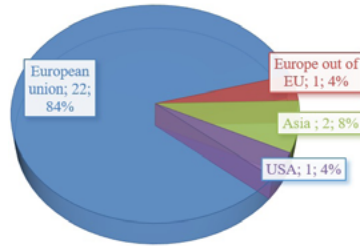
Source: Own research, 2017.

Figure 3 shows that in most companies which choose an ethnocentric model, mother companies are located in the European Union. The lowest number of such companies is located in Europe, but outside the EU and in the United States.

Figure 4 **Economic size of entities applying an ethnocentric model of corporate culture**
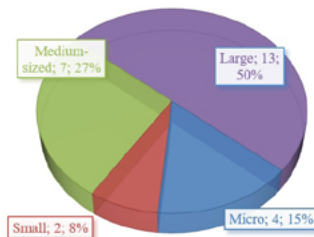
Source: Own research, 2017.

According to research, in Figure 4 it can be seen that small businesses very rarely choose this model of corporate culture. The share of these companies is only 8%. Instead, large companies often choose an ethnocentric model and their share is 50%.

Polycentric Corporate Culture

Polycentric type of corporate culture is typical for companies which are adapted to local conditions in the host country and local culture. In this case foreign subsidiaries have a great deal of discretion and can more or less independently set local targets. Profit created in host country is usually invested in this country, without effort of maternal company to invest profit in home country. The organization is primarily geographically structured and with the high autonomy of subsidiaries. Human resources management is based on local managers who best understand local market requirements, social and cultural habits and differences. The benefits of extensive autonomy and adaptation to the peculiarities of the local market are usually balanced by major coordination problems between foreign companies.

Figure 5 **The business focus of entities applying a polycentric model of corporate culture**

Source: Own research, 2017.

Figure 5 shows that in contradistinction to the ethnocentric model of corporate culture, the polycentric model is the most widespread in the enterprises, whose activity is concentrated on the sphere of production. The share of these enterprises is 40%. This model is the least used in the production and trade sector (4%).

Figure 6 **The residence region of mother company of entities applying a polycentric model of corporate culture**
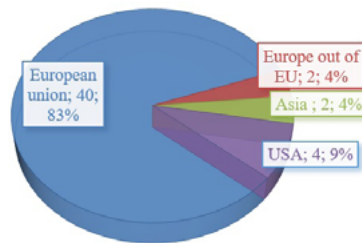
Source: Own research, 2017.

Figure 6 shows that the lowest number of companies which choose a polycentric model has mother companies in Asia (4%) and in Europe outside the EU (4%). In most companies which choose this model of corporate culture, mother companies are located in the European Union (83%).

Figure 7 **Economic size of entities applying a polycentric model of corporate culture**
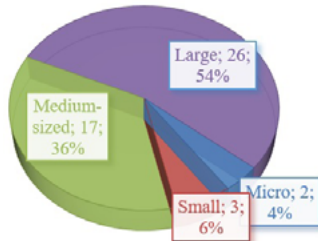
Source: Own research, 2017.

In Figure 7, 54% of large companies adopted a polycentric model in their business. The micro size companies very rarely use this model of corporate culture. According to this research, the share of these companies is equal to 4 %.

Global Corporate Culture

The global type of corporate culture adopt companies which goal is to create a unified management concept and corporate culture, independent of the culture in which parent and subsidiary companies are located. The enterprise strives to optimize business processes globally and knowingly prevents the dominant influence of the national culture of the parent company. Human resources strategy is based on the securing of key functions by the best workers, regardless of whether

they come from a parent country or not. Organizational forms are highly flexible and individual foreign subsidiaries work closely together. The problem of this model can be with unifying the common enterprise culture concept and the compatibility with host country cultures without possibility of any conflicts.

Figure 8 **The business focus of entities applying a global model of corporate culture**
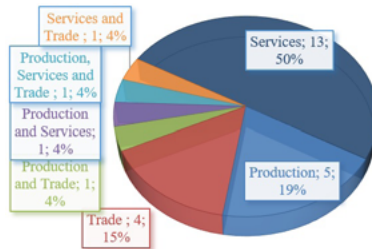
Source: Own research, 2017.

This research shows that the only one company from spheres as services and trade, production, services and trade, production and services, production and trade follow the global model of corporate culture in their business (Figure 8). 50% of the companies that chose this model are operating in the service sector. 19% of the sector is occupied by companies in the production area. Trade area occupies 15%. We can conclude that it is the same situation as with the ethnocentric model.

Figure 9 **The residence region of mother company of entities applying a global model of corporate culture**
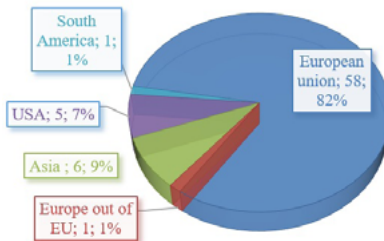
Source: Own research, 2017.

Figure 9 shows that in most companies which chose a global model of corporate culture, mother companies are located in the European Union (82%). The

lowest number of such companies is located in Europe outside the EU (1%) and South America (1%).

Figure 10 **Economic size of entities applying a global model of corporate culture**
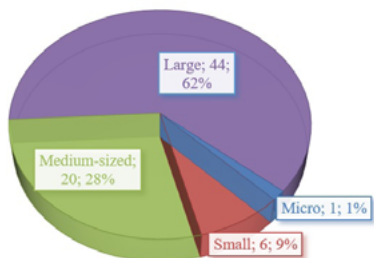
Source: Own research, 2017.

According to our research, in Figure 10 large companies often choose a global model of corporate culture and their share is 62%. The share of medium, small and micro enterprises occupies 28%, 9%, and 1% respectively.

These findings can be proved by the similar research of (Rouse, 2013), who states that corporate culture that reflects the broader culture is usually more successful than one that is at odds with it. For example, in the current global culture, which values transparency, equality and communication, a secretive company with a strictly hierarchical structure may have a public relations problem.

4   Conclusion

On the basis of the above considerations, it's reasonable to assume that corporate culture is proposed to be understood as rules and norms of behavior based on the material and spiritual values, cultural, ethical and social needs of workers to achieve the goals of the enterprise. 145 companies operating in the territory of the Slovak Republic and simultaneously connected with at least one foreign business entity operating outside the Slovak territory were the object of the study. Practice shows that it is almost impossible to implement the same habits and values as in the territory where the mother company is located. Therefore, it was necessary for enterprises to apply different approaches for the development of corporate culture. According to a study, most of the countries follow the global strategy. This suggests that most companies want to create a single corporate culture, regardless of the culture in which the mother and subsidiary companies are located.

Acknowledgements

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THE EVALUATION OF THREE PILLARS OF CORPORATE SOCIAL RESPONSIBILITY IN PRACTISE

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Abstract

The submitted article deals with the evaluation of three pillars of Corporate Social responsibilty (CSR) in practise. We used primary and secondary resources for this evaluation. At the beginning, we try to briefly introduce the issue of the renewed EU strategy for corporate social responsibility, the concept of stakeholders, instruments and certifications of CSR, the triple bottom line as well as dimensions and areas of intervention of the CSR. The main attention is devoted to the results and discussion, where the evaluation of three pillars (social, economic and environmental) activities of the business entity and with evaluation of the current state of perception of social responsibility by employees based on the questionnaire survey. At the end, we can state that company is responsible for all its employees, respects human rights, is strongly against child labour, antisocial and unethical business practices and combats discrimination. The corporate staffs are motivated by the flexible working time, possibility of home office, safe workplace, supporting social programs, special trainings opportunities, programs for professional enhancement, language courses, and courses for personal development.

Keywords: *corporate social responsibility (CSR), company, employees, questionnaire survey, triple bottom line (TBL)*

JEL classification: *L21, L29, M14, M51*

1   Introduction

In the modern world, it is very important to pay special and significant importance to the process of corporate and social responsibility (CSR). Socially responsible activity brings a new look at the social direction of the business and it brings benefits to organizations, both directly and indirectly, which provides a long-term competitive advantage. The origin of the corporate social responsibility dates back to the 19th century. The social aspects of CSR have existed before, there was always found some employer who has acted in this field beyond the laws of that time, but this behaviour has not been named as the CSR. For instance, business owners have built accommodations for their employees and thereby have manifested not only the interest in increasing productivity of workers, but they also believed that it could strengthen relations between the management and workers (Putnová and Seknička, 2007). The definition of corporate social responsibility concept has evolved, as well as the content, essence and understanding of CSR in the middle of the 20th century. The first definition of corporate social responsibility is based on the managerial template. Howard R. Bowen is considered the first theorist of socially responsible business, who in 1953 wrote the book ´Social Responsibility of the Businessman´. In this book, it is stated that corporate social responsibility represents in the obligation of businessmen to pursue a particular strategy to make particular decisions or carry out particular activities that are desirable from the point of view of the objectives and values of our company (Bussard et al, 2005). In 2011, the European Commission defined the CSR as the responsibility of corporations for their own impacts on the society. This interpretation is in line with the general characterization of the term responsibility. To be responsible for something mean that you must be aware of consequences of your actions. Also, we agree with Okhrimenko O. and Ivanova T. (2015) that the necessity of activating the implementation of the principles of Corporate Social Responsibility in the life of society, its legal and economic institutions are providing by the involvement of countries in the processes of globalization, economic integration, the importance of creating a positive image of domestic enterprises in international markets and on this basis obtaining additional competitive advantages .CSR, therefore, is the way in which the company deals with its impact on society. Among the issues typically taken into the consideration by the social responsibility, we find the way in which the activities of the enterprise are interested in the human rights, the rule of law, workers, the community and the environment. (Ormond, Itschert and Bir, 2015). According to Responsabilità Sociale d´Impresa Piemonte (2013), the CSR goes beyond compliance with legal regulations and identifies practices and behaviours that the company adopts on a voluntary basis, convinced of obtaining

results that can provide benefits and advantages to itself and to the context in which it operates. CSR encompasses critical firm actions that generally advance some form of social good, beyond simply what is required by law. Often these actions are aimed at building goodwill within the community (Aguinis and Glavas, 2012). Kašparová (2006) states that in 1979 Carroll A., one of the most active scholars, proposed a definition of the CSR which consisted of four components: economic, legal, ethical and voluntary. In 1991the voluntary responsibility was renamed on the philanthropic responsibility. Together with Freeman, completed definition with ratios of individual responsibilities and defined four levels of responsibility: economic (making profits), legal (respect the laws), ethical (be ethical), and philanthropic (being a good citizen). Based on Ubrežiová, A., Horská (2011), CSR has become a part of stakeholder agenda in 90's. In Slovakia entrepreneurs started to deal with the topic of CSR also in context of SMEs in 2000. At that time, the key performers were especially multinational companies. Over the time the concept of CSR has been adapted by number of Slovak SMEs as well. Currently, there exists positive, but rather slow process of CSR implementation in the companies followed by opinion Slovak SMEs should apply more active approach in their everyday activities. Malejčíková, Kozáková (2015). On the other hand, MNCs and SMEs should focus not only on profit (primary bottom line), but on people (second bottom line) and planet (third bottom line) aspects of their business activities as well Bielik, Smutka and Horská (2010). Lačný (2012) explained the concept of TBL as concept that leads to a broad view of business. TBL is based on the responsibility of organizations and specifically in the areas of economic, social and environmental. Its essence is to create interdependencies between these areas, and in achieving optimum, balanced relationship between them. The importance and significance of risks and barriers to our common sustainability in increasing possibilities and opportunities will impact on the transparency of economic and social impacts, as well as environmental impacts as essential components in effective decision-making of stakeholders' relations, investment decisions, and other market relations. From the viewpoint of view also Mura, Buleca (2014) and Ubrežiová, A, Horská (2011) explain that corporate social responsibility includes the economic, legal, ethical, and philanthropic expectations placed on organizations by society at a given point in time. Authors mention the concept Carroll´s four-part model of CSR.

2   Data and Methods

The main objective of the submitted article entitled "The Evaluation of Three Pillars of Corporate Social Responsibilty in Practise" is to provide and evaluate

information about the corporate social responsibility according to the perception of CSR by employees in the selected business entity. In relation to the evaluation of results, for the social audit of corporate social responsibility we selected two hypotheses. When formulating following hypothesis, we used the theoretical knowledge acquired during the elaboration of the subject of CSR and the current state of this issue.

H_1: We assume that the completed education of respondent has the impact on familiarity with the concept of corporate social responsibility.

H_2: We assume that there is the correlation between the respondent's work position and the feel of discrimination.

The social audit was realized in March 2017 in the selected company by questionnaire survey that was anonymous. The possibility to fill the questionnaire had 93 company employees at 3 levels of employment positions, from which 70 employees participated in research. The questions were formulated clearly, distinctly and every question was evaluated separately. The questionnaire for employees includes a total of 21 questions. For each investigated hypothesis was formulated baseline null hypothesis H_0 that claims conformity of what is compared, as well as was always formulated the alternative hypothesis H_1 against the zero hypothesis.

H_0: We assume that there is correlation between one investigated character and the other one investigated character.

H_1: We assume that there is no correlation between one investigated character and the other one investigated character.

For evaluating the hypothesis, we used statistical method of Fisher's Exact Test that determines the correlation between two variables based on Pr <= P relationship, which determines the statistical significance.

If Pr value < 0.05 significance level P, we do not reject the null hypothesis.

If Pr-value > 0.05 significance level P, we do reject the null hypothesis.

The hypotheses were tested by using SAS program.

3   Results and Discussion

The strategic decisions of company are based on the integrated and holistic concept which considers all three pillars of corporate social responsibility – economy, environment, society – and sets the framework for all corporate thoughts and actions. The social audit was attended by 70 employees of the company from the total of 93 employees, of which participated in the survey were 38 women and 32 men. In relative terms, the ratio of those surveyed is 54% women and 46% men. The biggest group had 50 respondents (71,43%) with the master or doctorate university degree, than 14 respondents (20%) with secondary school educational

attainment and the least 6 respondents (8,57%) with bachelor university degree. The seniority of employees was divided into 4 categories. The largest part of the staff is new, 43 (61,43%) personnel employed for less than two years. For the period from 2 to 5 years work in company 9 employees (12,86%), from 5 to 10 years work 10 employees (14,28%), and 8 employees (11,43%) are long-term employed for more than 10 years. The corporate staffs are positioned on 3 position levels. The least, 5 respondents (7,14%) were from management, 12 respondents (17,15%) were team leaders and 53 respondents (75,71%) were team members.

3.1 Social area of the CSR

The questionnaire survey was focused on the social area of CSR. Within the social responsibility we analyzed working conditions, labour relations, willingness of supervisor to discuss with employees at workplace, the respect of occupational health and safety regulations, feel of discrimination and educational activities in company. To the question "*How do you perceive working conditions?*" the major part of 35 respondents (50%) replied good, 27 respondents (38,58%) excellent, 7 respondents (10%) satisfactory and 4 respondents (5,72%) sufficiently. To question "*How do you perceive labour relations at workplace?*" the major part of 34 respondents (48,57%) replied again good, 18 (25,71%) excellent, 16 (22,86%) satisfactory, and 2 (2,86%) respondents insufficient. The perception of working conditions and labour relations is imaged in Figure 1.

Figure 1 **The perception of working conditions and labour relations by employees**
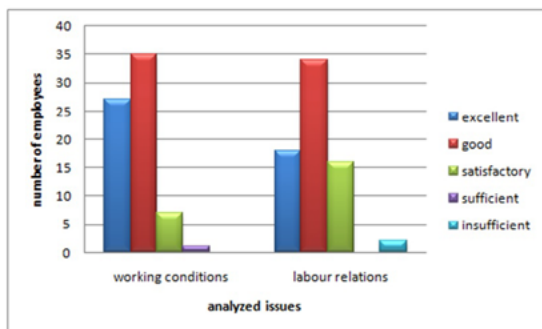
Source: Own processing.

On the question "*Is your supervisor willing to discuss with you at workplace?*" the major part of 57,14% respondents that represent 40 employees replied that their supervisor is always willing to discuss with them. Remaining 42,86%

represents 30 respondents who confirmed often willingness of supervisor and nobody stated rarely or never willingness. With the question "*Does the company respect regulations on occupational health and safety?*" strongly agreed 60 employees that is 85,71%, 8 employees representing 11,43% rather agreed and 2 of them that is 2,86% could not answer this question. We can proclaim that company is in compliance with occupational health and safety regulations. The further question gave the answer on the discrimination in the company. On question "*Do you feel discriminated in the company?*" 57 employees that is 81,43% replied that they have never experienced it within company and rejected discrimination. On the other side, 13 employees that is 18,57% confirmed that they have already felt that way. The educational activities, which are imaged in the Figure 2 were evaluated in this part, based on 3 positive statements and 5 levels of agreement with them. With the statement "*I am sufficiently informed of the possibility to benefit from educational activities*" 18 employees 25,71%) strongly agreed, 31 employees (44,28%) rather agreed, 11 employees (15,71%) rather disagreed and 10 employees (14,28%) had neutral stance. With the statement "*I am satisfied with educational activities in company*" 16 employees (22,86%) strongly agreed, 13 employees (18,57) rather agreed, 12 employees (17,14%) rather disagreed, 2 employees (2,86%) strongly disagreed and 27 employees (38,57%) had neutral stance. With the statement "*I actively participate in educational activities of the company*" strongly agreed only 10 employees (14,28%), 15 employees (21,43%) rather agreed, 20 employees (28,57%) rather disagreed, 5 employees (7,14%) strongly disagreed and 20 employees (28,57%) had neutral stance. We can state that employees are quite well informed about educational activities but their satisfaction and active participation is lower.

Figure 2 **The evaluation of the educational activities**
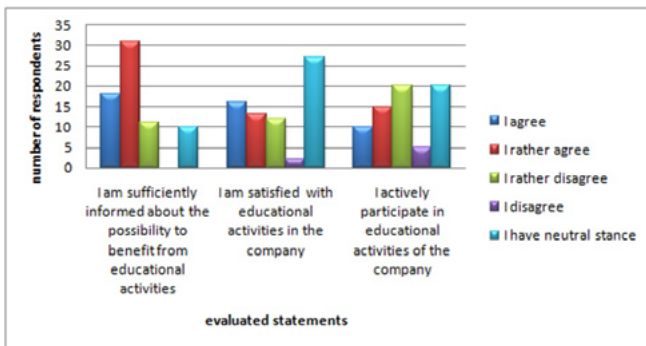
Source: Own processing.

According to Humieres and Chauveau (2001), employees are seen as the most important stakeholder. The similar results as in our survey were achieved in the one realized by FOCUS (2010). Also, according to Skýpalová, Kučerová and Blašková (2016) we can say that regardless of the company size, most activities of the social pillar are carried out in the area of corporate ethics and corporate culture, in the health and safety of employees and in the care of training and re-training of employees.

3.2 Economic area of CSR

The further part of CSR pillars in the questionnaire survey was focused on the economic area. The economic responsibility we evaluated like the interest of company in specific requirements of its customers, fight against corruption, and strength of corporate competitiveness against other competing companies. We used the following questions. *"Is the company interested in the specific requirements of its customers?"* 44 employees (62,86%) agreed and stated that company cares about customer requirements and produces specific products according to their requests. Other 26 employees (37,14%) did not answer. The question "*Does the company fight against corruption?*" 55 employees (78,58%) agreed with the statement that company introduces and informs about the principles of anti-corruption, 14 employees (20%) did not answer and 1 employee (1,42%) answered that company is not involved in the fight against corruption, offers and gains undue advantages. By the third question "*Is the company competitive enough against the other competing companies?*" 41 employees (58,57%) agreed that company has very strong competitiveness, 5 employees (7,14%) disagreed and according to them company should increase its competitiveness, and 24 employees (34,29%) could not answer. The answers of respondents on economic activities of company are summed up and imaged in the Figure 3. The economic pillar of CSR activities is on the high level. All respondents who are informed about customers' relations confirmed that company operates according customer's requirements. All informed respondents except one also confirmed the corporate fight against corruption and with enough strong competitiveness agreed 89% of informed respondents. In spite of the economic pillar is at high level, we must point out that it is advisable to increase the awareness of employees about the economic activities of CSR.

Figure 3 **Perception of economic activities**
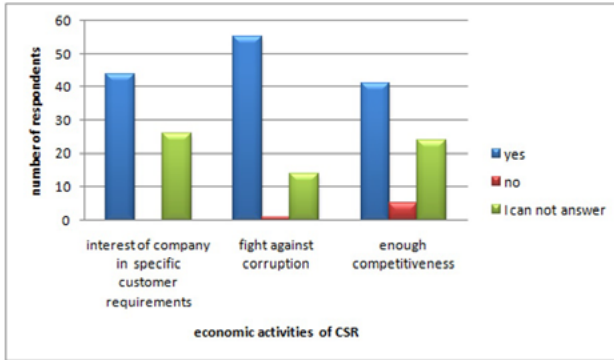
Source: Own processing.

We can compare our results with Hambalková and Lušnáková (2012), the argument, which is often used against the application of social responsibility is that companies are simply not able to pay the increased cost of its implementation. Yet corporate responsibility ultimately has a direct effect on reducing the environmental and production costs, to attract and retain a skilled workforce and also to discover new niches or even new markets. One of the benefits of corporate social responsibility is risk management. Enterprise, which perceives the surrounding environment and takes into account its interests, is better able to anticipate potential risks and promptly respond to changes that may occur and have an impact on the success of the enterprise. Hohnen (2007).

3.3   Environmental area of CSR

With the first question "*Does the company separate the waste for the recycling?*" agreed to 68 respondents that represent 97,14% of employees. They confirmed that company separates produced waste and all of them separate it, too. Other 2 employees representing 2,86% were not informed and could not answer. The second question was composed of 4 positive statements and 5 levels to express their consent. With the statement "*Enterprise is wasteful with water*" nobody strongly agreed, 4 employees (5,71%) rather agreed, 16 employees (22,87%) rather disagreed, 25 employees (35,71%) strongly disagreed and 25 employees (35,71%) could not answer. With the statement "*Enterprise is wasteful with electricity*" 4 employees (5,71%) strongly agreed, 10 employees (14,28%) rather agreed, 16 employees (22,87%) rather disagreed, 24 employees (34,27%) strongly disagreed and 16 employees (22,87%) could not answer. With third statement "*Enterprise is*

wasteful with paper" 4 employees (5,71%) strongly agreed, 12 employees (17,14%) rather agreed, 9 employees (12,85%) rather disagreed, 1 employee (1,42%) strongly disagreed and 15 employees (21,42%) could not answer. With the last statement "*Enterprise uses its resources rationally and efficiently*" 14 employees (20%) strongly agreed, 31 employees (44,28%) rather agreed, 9 employees (12,85%) rather disagreed, 1 employee (1,42%) strongly disagreed and 15 employees (21,42%) could not answer. Results of respondents´ perception of wastage in company are summed up and imaged in the Figure 4. The company perceives the impact and responsibility towards the environment and this is why implements the recycling principles and acts according to statutory regulations. We were interested how the employees perceive business activities that the company performs in environmental field and their knowledge of the given activity. The employees are well informed about the waste separation in company. They perceive the use of resources as responsible and efficient, but company can decrease the wastage even more and increase its awareness.

Figure 4 **Consideration of wastage in company**
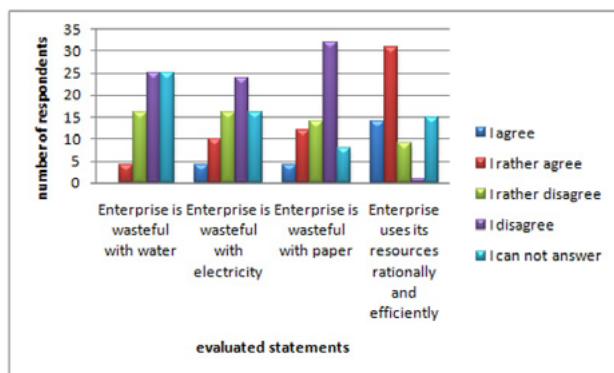
Source: Own processing.

In the research of Skýpalová, Kučerová, and Blašková (2016) we can notice that regardless of company size, the most frequent are: waste reduction and total waste management, recycling, use of recycled paper waste and Reduction of consumption of materials, energy, and water. These are activities that bring benefits and cost savings to enterprises and are widely used and supported by the society.

3.4   The evaluation of hypothesis

As we mentioned above, we determinate two hypothesis. In the context of question about the familiarity of respondents with the concept of CSR, we decided to assess the hypothesis 1, which assume that the completed education of the respondent has the impact on familiarity with the concept of corporate social responsibility. We tested the hypothesis:

H_0: There is correlation between the familiarity of respondent with the concept of CSR and respondent´s completed education.

H_1: There is no correlation between the familiarity of respondent with the concept of CSR and respondent´s completed education.

Based on the result of Fisher's Exact Test (Pr <= P), we do not reject the null hypothesis (Pr-value 0.0368 < 0.05 significance level), that means that there is correlation between the familiarity of respondent with the concept of CSR and respondent´s completed education and the completed education of the respondent has the impact on familiarity with the concept of corporate social responsibility. In the context of question about the respondent's feel of discrimination in the company, we decided to assess the hypothesis 2, which assume that there is correlation between the respondent's work position and its feel of discrimination. We tested the hypothesis:

H_0: There is correlation between the respondent's work position and its feel of discrimination.

H_1: There is no correlation between the respondent's work position and its feel of discrimination.

Based on the result of Fisher's Exact Test (Pr <= P), we do reject the null hypothesis (Pr-value 1.00 > 0.05 significance level), that means that there is no correlation between the respondent's work position and its feel of discrimination. Our hypothesis was rejected because the work position is not the only one aspect which influences the respondent's feel of discrimination. The feeling of discrimination can be caused by several reasons. Other factors which can have impact on the feel of discrimination cover for instance the gender, nationality or seniority of respondent in company. However, we assume that the principal reason is the personal attitude of the individuals, which causes conflicts in human relations. Lančarič, Chebeň and Savov (2015) dealt with these problems in connection with the background of the implementation of diversity management from the point of view of factors having a direct influence on this process. We evaluate the influence of the legal form (as an expression of the number of owners and the ability to quickly adopt a new concept) of the business organisation, the size (number of employees) of the business organisation and the share of the foreign capital in the ownership structure of the organisations.

4   Conclusions

Nowadays, the concept of corporate social responsibility representing an increasingly important aspect of the strategic corporate behaviour should be a priority of each company. It expresses the responsibility of corporation for its impact on the society, specifically in the social, economic and environmental scope. CSR concept extends to all areas of corporate actions including the relations with stakeholders, the quality of life of its employees and customers, profit maximizing, business ethics, community work, human rights, rules of law, anti-discrimination measures, transparency, ecology, environmental protection and others. Our recommendations are based on our research in company:

■ Enhancement of the awareness of the corporate social responsibility: Our proposal for the further improvement of CSR activities in company is primarily to enhance awareness of the corporate social responsibility and its activities. We propose the regular report publishing on the corporate social responsibility of the company. Reports on CSR should be natural part of large multinational companies and should be created in language version depending on country in which the company operates.

■ Improvement of charity work: Company should increase its charitable activities, should be more involved in charity events and provide material assistance to those who are in need, too. Charity aid is important part of corporate culture and reflects the core values of the company.

■ Corporate transportation of workers to work and from work. The major part of employees live in the surroundings and almost all of them arrive to workplace by car. They not only look for parking place, which is usually overcrowded, but they create lot of emissions from a large number of employees arriving by cars. Our proposal is to secure the corporate transportation of workers to work and from work. It could be carried on by corporation bus, which would have set schedule of departure and arrival, as well as the bus stops.

■ Improvement of canteen meals: the company provides canteen located at premises of the workplace and offers lunch and dinner with a wide choice. The employees cover only certain part of the price, because greater part of meals is reimbursed by subsidies. Based on the interview with employees, we propose to cook tastier meals for higher satisfaction from availability of canteen at workplace. The employees would be able to pay more for better quality and taste of meals.

■ Creation of rest zone for employees: The further proposal is the creation of rest zone. The employees would have the possibility to take a small break in this zone and after that would return to their work refreshed with new power

and ideas. The rest room could provide some games or gaming console for limited time. We suppose that this would be also motivation for employees and it would increase their efficiency.

- Embellishment of design in offices: Our last proposal is the embellishment of design in offices with the corporate motives. The big highlighted company logo could be hung on the wall as well as the corporate slogan, or projects that were realized by company. It could evoke even better atmosphere at the workplace.

Acknowledgements

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GENDER DIFFERENCES IN CONTEMPORARY EUROPE - IS THE POSITION OF FEMALES REALLY EQUAL IN EUROPE?

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Abstract

The article is rising up from the Gender stereotypes connected to the top positions of the women involved in the labour market internationally. Four factors that have the main impact on the gender differences were analysed (education, employment, poverty, pay gap and representation in leading positions) through the quantitative analysis for the selected countries of EU in 2016. Although women have in the EU average higher education levels than men, the average gender pay gap is up to 16.1% and more females than males are at risk of poverty or social exclusion in all of the examined countries.

Keywords: *woman, leading position, European Union, gender gap*

JEL classification: *J11, J16, J31, J71*

1   Introduction

The European Commission's (2016) report on equality between women and men states that differences in gender have narrowed in recent years, but there are still "wide differences between Member States". The Committee on Women's Rights and Gender Equality (2017) adds that the employment rate for women has so far reached the highest value (64.5%) in 2015, but still lags significantly behind the male employment rate (75.6%). It is regrettable that the probability of recruiting and staying longer, often involuntary, is four times higher for women than for

men, as many young people in particular in Greece, Spain, Croatia, Italy, Cyprus, Portugal and Slovakia they remain in poverty even though they have a job. In the EU, we can talk about the ongoing feminisation of poverty. According to Eurofound (2016): these differences stand for the EU at around € 370 billion per year, representing 2.8% of the Union's GDP. However, the inclusion of women in the labour process alone does not address the issue of gender equality. According to the European Commission (2016), three quarters of the homework and two thirds of parental care are performed by women, who in the vast majority of cases carry a double burden of duty (as women generally have an incomparably greater responsibility for parental care and home care). However, in this context, the European Parliament (2017) notes that equality between women and men is a fundamental right enshrined in the Treaty on European Union and the Charter of Fundamental Rights, the objective of the European Union in this area is to ensure equal opportunities and treatment for men and women and to combat any discrimination based on sex. The share of women in the national / federal parliaments of the EU countries has increased by only 6% over the last decade, reaching 29% in 2015. In the same year, only 6.5% of women were among the largest listed companies among the presidents and CEOs. Around 71% of the members of the Governing Council are men, only one of the three boards is chaired by a woman, and only 6 women (Eurofound, 2015) are from the EU's 42 Directors-General. Both horizontal and vertical gender segregation is a continuing phenomenon even in the conditions of modern European Union society.

2   Data and Methods

Article is based on the Gender analysis in the selected European countries. The main task of this analysis was to describe current situation through quantitative analysis and to identify the trends in development as well as the factors that have had the greatest impact on the differences between man and woman. These differences were evaluated in relation to education, to employment and in the relation to the share of gender represented in the management positions.

The relation to the education was evaluated through the indicators as the share of population with less than primary, primary and lower secondary education in selected countries by sex and the share of population with tertiary education in selected countries by sex. For the relation to employment indicators as the percentage of employed adult population (16-64) by sex and the share of adult population at risk of poverty or social exclusion by sex were used. The relation to the differences between man and woman in management was assessed through the indicator of the Gender pay gap in unadjusted form by selected NACE Rev. 2

activity and the share of woman as a board members. Regarding to the number of indicators and countries included in the analysis, only 2016 was selected for the reference period. Analysis includes selected EU 27 countries.

3   Results and Discussion

Gender stereotypes (GECCoF, 2015) are preconceived ideas whereby females and males are arbitrarily assigned characteristics and roles determined and limited by their gender. Stereotypes about women both result from, and are the cause of, deeply engrained attitudes, values, norms and prejudices against women. The notion of gender is according to Šnýdrová, (2006) related to the gender of the individual. Attributed to gender are various characteristic features as the way of life and behavior, i.e. those which were not given with the birth, but formed as a result of roles played by men and women in the history of mankind, their socialization as well. Taylor (2003) adds that many masculine and feminine characteristics are not biological at all, they are learned or acquired. Gender schema theory suggests that youngsters develop a sense of femaleness and maleness based on gender stereotypes and organize their behaviour around these (Egerová, et al., 2013). Even if societies have gone through substantial changes and recorded certain progress in this field, an imbalance between men and women is enduring. It can be proven e.g. by the inequalities in wages, poor representation of women in top management positions (Mihalčová, et al., 2015). Gender differences are mostly visible in the inequalities of education, employment, poverty and pay gap (Eger, et al., 2012).

3.1   Education

In countries that do provide social benefits, for women the financial need to find a job might on average be less pronounced. Such policies might then take away a push onto the labor market especially among women for whom financial needs are a core motivation to seek employment, lower educated women, as they are more likely to be condemned to low-quality work (Besamusca et al., 2015). In contrast, higher educated women can obtain higher quality jobs, which makes that their labor market entry is less likely to be discouraged by governments providing social security benefits. In sum, social security benefits in a country increase differences between higher and lower educated women in employment (Bussemakers, 2017).

Figure 1 **Population with less than primary, primary and lower secondary education in selected countries by gender in % (2016)**
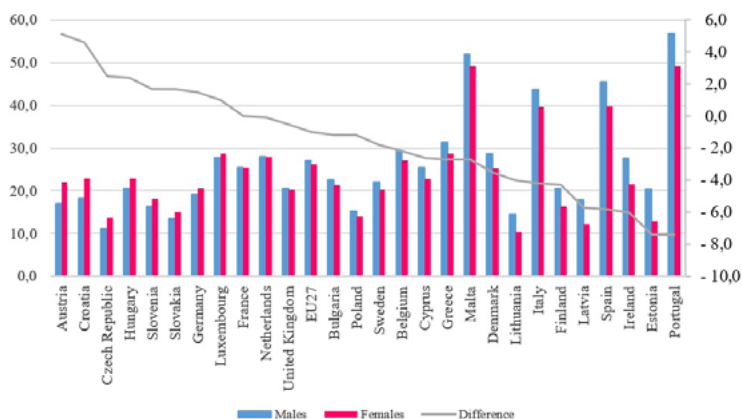
Source: Own processing based on Eurostat, 2017.

By looking at the gaps between the gender with less than primary, primary and lower secondary education there are 8 countries where the females outweigh the males with the highest percentage gap of 5,1 % in Austria. France has equal percentage of this education for both genders. On the other side there are more males with less than primary, primary and lower secondary education than females in 15 countries with the biggest difference of 7,4% in Portugal and Estonia.

Figure 2 **Population with tertiary education in selected countries by gender in % (2016)**
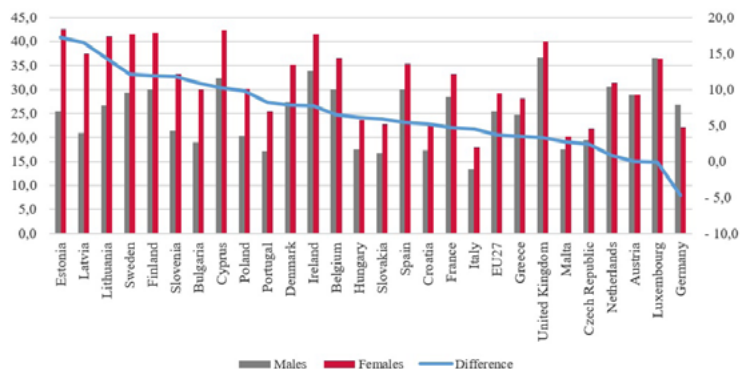
Source: Own processing based on Eurostat, 2017.

The percentage of males with less than primary, primary and lower secondary education is in the average of EU 27 states 27,1% and females 1% less, from which can be assumed that females obtain on average higher education than males. This is also visible in the graph 2 where the percentage of females with tertiary education is higher by 3,7 % in the average of EU 27. Females with tertiary education has obtained higher percentage than males in the most EU 27 countries with the highest gap in Estonia (17,2%). Lower number females obtained just in the Luxembourg and Germany with the highest gap of 4,7 %.

Higher education tends to place emphasis on autonomy, self-enhancement, and a critical attitude toward authority. Therefore, women who attained higher education are more likely to regard employment as an important part of a fulfilling life than lower education women are on average. Also, they are expected to feel somewhat less pressured to act in accordance with patriarchal social norms. (Chau, 2016; Kabeer, 2017; Pradhan et al., 2015)

3.2   Employment

According to ŠÚSR (2016), women in Slovakia have a long-term lower employment rate than men (in the last ten years, on average, 13-16%). On the other hand, the female employment rate was less prone to cyclical or seasonal fluctuations, such as the economic crisis since 2008.

The difference between genders is clearly visible in employment of adults in all the selected countries where the males outweighs the females. In the average of EU 27 countries there is higher employment of adult males than females by 10, 5%. 18 countries are below this average with Lithuania as a country with the lowest gap of 1,2%. On the other side Malta had the highest percentage gap of 25.6%. Employment of females is in average of EU 27 countries 61, 5 % and 72 % of males.

Figure 3 **Employment (percentage of total population) of adult population (16-64) by gender in selected countries (2016)**
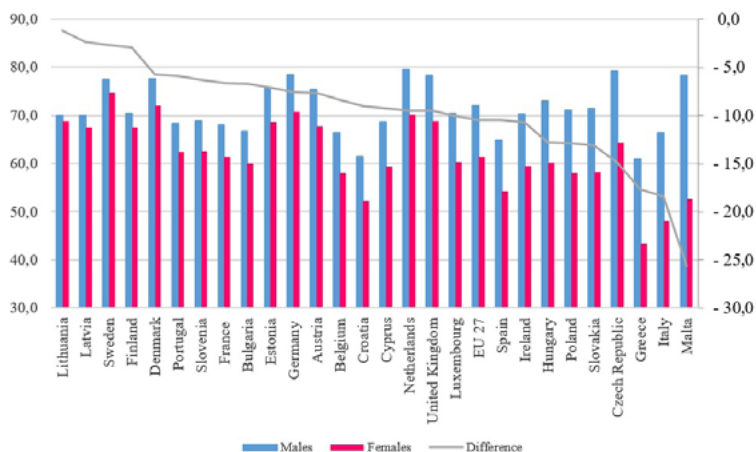
Source: Own processing based on Eurostat, 2017.

Sweden is the country with the highest employment of females with the number of 74,8% . The lowest employment can be seen in Greece in both genders, with the number of 43,3% for females and 61% for males. This situation is surprising according to the education of females, who are higher educated in the most of the EU countries. Their higher qualification should be connected with the higher employment rate, but the opposite state can be seen. It is caused by their position in the society as a mothers and other gender stereotypes.

3.3 Poverty

The World Bank (2009) defined poverty as helplessness and insufficient freedom for functioning. Poverty is comprehended as an inability to come up to minimum standards of living. The United Nations (2017) has defined poverty much more broadly than simply a lack of income. It argues that its "human rights" definition of poverty leads to "more adequate responses to the many facets of poverty." It gives due attention to the critical vulnerability and subjective assaults on human dignity that accompany poverty.

High unemployment and poverty rate is one of the sorest social and economic problems which interfere relevant application of advantages provided for women by economics (Liaišoené, 2015)

Figure 4 **People (adult population) at risk of poverty or social exclusion by gender in 2016 (%)**
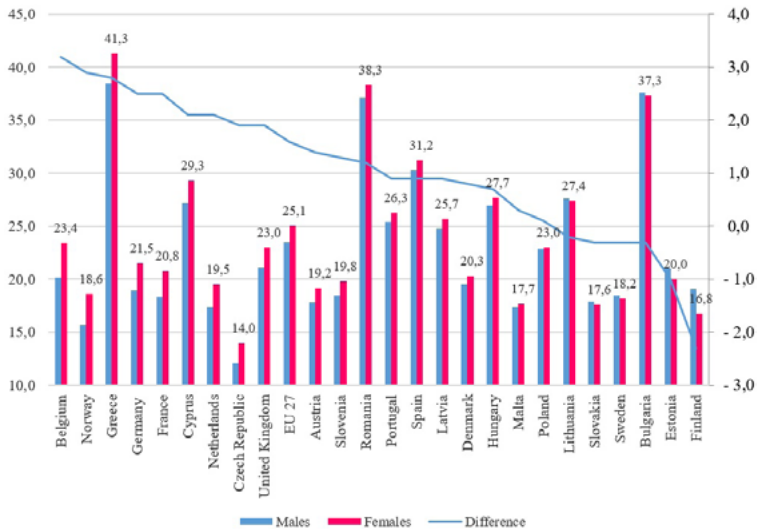
Source: Own processing based on Eurostat, 2017.

The highest number of adults at risk of poverty or social exclusion can be seen in Greece with 41,3% for females and Romania and Bulgaria following. Adult females at risk of poverty or social exclusion is on average of EU 27 countries 25,1 %, which is higher by 1,6% than males. Lithuania, Slovakia, Sweden, Bulgaria, Estonia and Finland were the only countries where males outweighs females.

3.4 Pay gap

According to European Commission (2017) gender pay gap reflects ongoing discrimination and inequalities in the labour market which, in practice, mainly affect women. Its causes are complex and interrelated.

Table 1 **Gender pay gap (%) in unadjusted form by selected NACE Rev. 2 activity in selected countries 2016**

Country	Industry, construction and services	Manufacturing	Accommodation and food service activities	Information and communication	Arts, entertainment and recreation	Human health and social work activities	Education	Financial and insurance activities	Information and communication
Czech Republic	22,5	27,3	7,6	32,5	14,2	27,8	25,3	40,9	32,5
Estonia	26,9	30,4	14	25,5	19,3	29,1	21,6	35,4	25,5
Slovakia	19,6	26,8	13,6	27,7	19,6	26,2	14,7	37,5	27,7
United Kingdom	20,8	19,1	11,2	16,8	37,5	26,6	20,2	37,2	16,8
Germany	22	25,5	9,2	25	31,9	21,6	12,5	28,8	25
Lithuania	14,2	26,2	13,9	29,5	12,5	34,3	2,5	38,5	29,5
Portugal	17,8	31,6	17,9	11,1	43,5	28,3	10,6	23,8	11,1
Cyprus	14,0	29,2	15,8	13,5	63,3	12,9	7	24,9	13,5
Austria	21,7	22,7	5,8	22,7	26,4	12,8	24,1	30,5	22,7
Bulgaria	15,4	26,2	11,8	19,2	7,9	31,7	15,5	22,5	19,2
Netherlands	16,1	19,3	12,7	18,4	21	21,8	11,3	29,1	18,4
Switzerland	17,7	17,9	8	22,3	13,1	19,8	8,5	31,5	22,3
Poland	7,7	20,9	11,9	25,5	9,7	17,4	5,1	36,7	25,5
Hungary	14,0	19,9	13,8	22	15,9	16	11,7	23,9	22
France	15,8	14,1	7,4	11,8	30,3	14,9	19,1	30,7	11,8
Finland	17,3	10,2	9,3	13,5	10,2	26	15,2	32,5	13,5
Italy	5,5	15	12,7	17,4	16,45	30,1	10,3	22	17,4
Latvia	17,0	18,9	14,1	10,9	17,8	22,1	1,2	29,4	10,9
Spain	14,9	19,1	12,1	13,7	17,2	22	7,9	18,1	13,7
Slovenia	8,1	14,3	8,3	16,2	15,7	20,9	13,6	22,9	16,2
Norway	14,9	11,5	9,7	15,4	10,5	11,2	8,2	29,5	15,4
Romania	5,8	17,9	5,2	19,1	14,2	6,8	2,2	24,2	19,1
Luxembourg	5,5	15,3	12,2	19	13,9	0,1	3,9	23,1	19
Denmark	15,1	10,9	3,7	17,3	9	8,9	5,7	20	17,3

Country	Industry, construction and services	Manufacturing	Accommodation and food service activities	Information and communication	Arts, entertainment and recreation	Human health and social work activities	Education	Financial and insurance activities	Information and communication
Sweden	14,0	5	6,1	10,6	7,4	12	10,1	26,3	10,6
Belgium	6,5	6,2	5,4	11,8	1,1	-0,6	3	20,2	11,8
EU 27	15,0	19,3	10,5	18,8	19,2	19,3	11,2	28,5	18,8

Source: Own processing based on Eurostat, 2017.

On average of EU 27 males earns more than females in the industry of Financial and insurance activities by 28,5 %. In most of the industries the pay gap varies around 19 %. From selected industries Education is the one with lowest pay gap (11,2 %) what can be expected according to the gender stereotypes where Education is considered as a typically feminine profession. Out of nine examined industries Czech Republic was the country with the biggest difference between salary of males and females in four industries (Information and communication, Education, Financial and insurance activities, Information and communication).

The position of females is the most equal in Sweden society where the difference is the lowest in three of the selected industries (Manufacturing, Information and communication, Information and communication). Overall the best results achieved Belgium, with even negative percentage of -0,6 in Human health and social work activities, which means that this was the only country and the only industry where females earns more than males.

3.5 Woman in leading positions

Gender stereotypes caused several problems in actual situation of woman in leading positions. According to Thebaud and Doering (2017) when men work in a managerial job that people associate with a man and male stereotypes, they are able to wield a substantial amount of authority over clients. But when the very same managerial job happens to be associated with a woman, men who work in that position are viewed as significantly less legitimate sources of authority. The main source of unequal representation of men and women in managerial positions is the problem of harmonization of labour and family requirements. (Mihalčová, et al., 2015)

Figure 5 **The share of women in largest listed companies: presidents, board members and employee representatives**
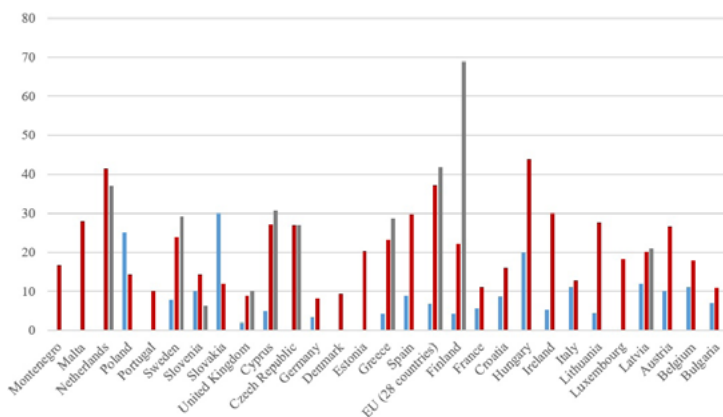
Source: Own processing based on EIGE, 2016.

The share of woman in employee representatives in largest listed companies' in-selected EU countries was the highest in Finland with the number of 69%. From EU 28, 19 countries had zero woman in this position, which means that only males occupied this position. Hungary was the country with the highest share of woman in the position of board member (44%). All the EU 28 countries reported woman on this position with the lowest share in Germany (8,2%) and UK following (8,8%). There is no woman on the position of president in 8 countries and the highest share was seen in Slovakia (30%) following by Poland (25%) and Hungary (20%).

According to Sheffield (2016) women in Eastern European nations fared better. Estonia, Latvia and Poland topped the diversity rankings with more than a third of senior roles in the region held by women. Researchers said this may be partly due to the legacy of communism, which expounded the virtues of equality.

4   Conclusion

"Gender Awareness-raising" or "Raising awareness of gender equality" or even "gender-sensitive behaviour" is based on the equality of men and women in normal activities or in ordinary communication. In practice, this approach should be reflected, for example, in securing the same number of invited men and women at major events, avoiding showing success through male visualization, or other targeted efforts to eliminate gender differences.

Factors as education, employment, poverty, pay gap and representation in leading positions were analysed to recognise the gender differences and position of woman in EU countries society. In the category of less than primary, primary and lower secondary education is representation of males and females more or less equal, with just one percent lower difference for females on average. On the other hand, in EU 27 more females obtain higher (tertiary) education by 3, 7 %. However the number of employed females is much lower than it would be expected, with the difference of 10, 5 %. It can be caused by the position of woman in society and gender stereotypes. In spite of the fact that there can be several reasons for unemployment of woman (maternity leave, housewife career, employers preferences, etc.) these can generally cause higher number of females threatened by poverty compared to males. This difference is not radical (1, 6 %) but it touches 19 out of EU 27 countries in which females outweigh males.

The next important indicator for gender differences is pay gap, which is visible in all of the EU 27 countries and all examined industries. Exact amount of pay gap between man and woman cannot be generalized, because it varies between the selected industries with the range of 11,2-28,5% in the average of EU 27. Out of the selected industries the biggest gap was seen in Cyprus in the arts, entertainment and recreation industry (63,3%) and the lowest in Belgium (-0,6%) in Human health and social work activities, which was the only country with the result of higher salary of females than males. In the most of the EU-28 there were more males working on the position of employee representatives in largest listed companies', but generally on all of the leading positions males outweigh females except of the position of employee representatives in Finland.

Acknowledgements

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CORPORATE SOCIAL RESPONSIBILITY OF AGRIBUSINESS COMPANIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract

The main goal of the article is to describe the issue of social responsibility of agribusiness companies in the context of sustainable development. Social responsibility in business is the concept of the organization's voluntary consideration for social and environmental aspects while conducting business. The article presents the issues of CSR and sustainable development in a theoretical approach and the results of research carried out by means of a diagnostic survey in 2016 in 200 Polish agribusiness companies, concerning their practical application of the idea of social responsibility in their functioning. The survey questionnaire was targeted at the management staff of 210 deliberately selected agribusiness companies from Kujawsko-pomorskie and Pomorskie Provinces of Poland. The feedback, in the form of correctly completed questionnaires, was obtained from 200 respondents. The data thus obtained was then analyzed statistically. Research has shown that the state of knowledge about CSR and sustainable development is quite good, however, daily practice is slightly different from the theory and knowledge.

Keywords: *agribusiness, CSR, corporate social responsibility, sustainable development*

JEL classification: *Q01, Q13, Q56*

1   Introduction

In a dynamically developing market economy, more and more enterprises, including those of agribusiness, strive for economic success and also recognize the need to implement social and ecological activities (Olejniczak, 2013). This management should focus on respecting the principles of sustainable development. Sustainable development is defined as socio-economic development, in which occurs the process of integrating political, economic and social activities, while preserving the environmental balance and durability of basic natural processes, in order to guarantee the possibility of satisfying the basic needs of individual communities or citizens of both the contemporary generation as well as future generations (Environmental Protection Law, 2001; Wielewska, Gliniak, Sobczyk, Prus 2017).

A. Pawłowski (2009) proposes to expand the number of determinants of sustainable development by such areas as:
–   ethical considerations (the question of man's responsibility for nature),
–   the ecological aspect (protection of the natural environment and that processed by man, in this aspect spatial planning is also included),
–   social consideration (not only the natural environment, but also the social environment can be degraded),
–   political aspect (formulation of sustainable development strategies, their implementation and control),
–   technical aspect (new technologies, economising on raw materials),
–   economic aspect (taxes, subsidies and other economic instruments),
–   legal aspect (environmental law).

This concept shows social responsibility of business enterprises (*Polish abbr.* SOP), also called corporate social responsibility (CSR) or most often just CSR.

1.1   CSR and sustainable development

CSR is a concept of integrated management that takes into account the company's responsibility for the impact that it has on employees, customers, shareholders, local communities and the natural environment. It is also a search for synergy and business contribution to the implementation of all dimensions of the policy of sustainable economic development. Generally speaking, corporate social responsibility (of a company) is a concept according to which economic entities which are at the stage of building a business strategy voluntarily take into account social interests and environmental protection as well as relations with various

stakeholder groups (Ratajczak, 2012). In the context of the concept of corporate social responsibility, the stakeholders of agribusiness entities are: investors, shareholders, customers, competitors, employees, as well as the state, local communities and social organizations (Filek, 2006), which are in the range of their impact.

The objective scope of corporate social responsibility includes, among others,: compliance with legal norms, philanthropy and development of the local community, environmental protection, sustainable development, animal rights, human rights, employee rights, market relations, corruption and corporate governance (Codogni, 2012).

Table 1 **Arguments for and against corporate social responsibility**

Arguments in favour of social responsibility	Arguments against social responsibility
Economic activity creates problems and therefore enterprises should participate in solving them. Employees of the enterprise also create social groups to which the company is responsible. The enterprise has the necessary resources to solve social problems. Enterprises are partners in economy, just like the government and society, therefore they should strive to meet the socio-economic and ecological needs of their partners. By accepting its social, economic and ecological obligations, it acts in its own and social interest.	The purpose of a business enterprise is to bring profits to its owners. The enterprise has no non-economic obligations except for those stipulated by legislation. Involvement in social programs allows enterprises to influence the environment. There is a possibility of a conflict of interest. Enterprises lack experience in managing social programs. All decisions unrelated to the market game cause a decrease in economic efficiency and loss of management time and energy, which reduces economic efficiency. It is dangerous for democracy, because it can lead to the politicization of the enterprise.

Source: Kryk, 2005.

It is crucial for enterprises to preserve economic efficiency which, combined with the need to adapt to any applicable legal regulations - in particular also environmental ones, enforces certain necessary formal requirements as well as high environmental awareness, responsibility, motivation and effective, active management of production assets. Also, there is often the necessity to invest considerable financial means in the sphere of environmental protection. In conclusion, CSR is based on the principle that enterprises in connection with their activities do not only bear legal and economic responsibility, but are also obliged to undertake

activities that will contribute to the protection and raising social standards (Na-konieczna, 2008).

The following factors that particularly speak for the realisation of this concept in companies as well as the integration of their business strategies with environmental requirements (Kaczmarek, 2011):

– emergence of norms and regulations regarding environmental protection;
– increase of consumers' sensitivity to ecological issues combined with 'rank and rifle' pressure exerted on enterprises to care for the condition of the environment;
– technological progress contributing to the emergence of pro-ecological technologies.

It should be noted that "the concept of sustainable development refers not only to business operations, but also applies to the attitudes of governments, local government units, all state institutions and the whole society. The concept of CSR focuses on a given organization; it is both a certain philosophy and a set of tools to achieve a sustainable business status which, in the long term, apart from obvious environmental and social benefits, guarantees a long-term increase in the value of the enterprise" (Żelazna-Blicharz, 2013, p. 40).

It follows that the concept of sustainable development should be considered a much wider issue than corporate social responsibility.

2   Data and Methods

The aim of this study is to present the issue of social responsibility of agribusiness enterprises in the context of sustainable development. Research was conducted in 2016 by means of a diagnostic survey, in which a questionnaire technique was employed. The survey questionnaire was addressed to the management staff of 210 intentionally selected agribusiness companies from Kujawsko-pomorskie and Pomorskie Provinces of Poland. The feedback was obtained from 200 business entities, in the form of correctly completed questionnaires. There were 151 small companies with 10-50 employees (75.5%), 40 medium-sized companies with 51-250 employees (20.0%) and 9 large companies with over 250 employees (4.5%). The research excluded micro businesses with fewer than 9 employees. The data thus obtained was then subject to a statistical analysis.

3   Results and Discussion

The questionnaire was answered by 200 respondents – representatives of management staff of agribusiness companies from the Kujawsko-pomorskie and Pomorskie Provinces. The study included 31 women (16.5%) and 169 men (83.5%). The respondents were mainly people from the 46-55 age group. They constituted 41.5% of the respondents (83 people). In the age group of 36-45, there were 44 respondents (22.0%). In turn, 39 people (14.5%) were aged 26-35. The group of respondents over 55 (33 people) accounted for 16.5% of the total. Only one of the respondents (0.5%) was younger than 25 years old.

The respondents were asked to self-assess their knowledge of the concept of corporate social responsibility. Nearly 80% of the surveyed claimed to know the concept, of whom 37.5% said they definitely knew it (75 people), and 43.5% said they fairly knew it (87 people). 5% of the respondents (10 people) were not able to specify whether they have any knowledge of the CSR concept or not, and 14% concluded that the idea was not known to them (27 people).

The vast majority of the respondents (83%) identify the concept of corporate social responsibility of business enterprises with the idea of sustainable development (Table 2). The opposite answer was given by 15% of the respondents, and 2% did not have an opinion in this regard.

Table 2 **Identifying the concept of corporate social responsibility with the idea of sustainable development, in the opinion of the respondents**

Specification	N=200	%
definitely yes	70	35.0
rather yes	96	48.0
difficult to say	4	2.0
rather not	25	12.5
definitely not	5	2.5
Total	200	100.0

Source: Author's own study based on research conducted.

The identification of the concept of corporate social responsibility with the idea of sustainable development can be found in many studies. These issues are dealt with, among others, by B. Jamka (2010), A. Chodyński (2012).

Those enterprises which 4are guided by the principle of corporate social responsibility should primarily (Kryk 2011):
– cease and refrain from activities considered to be socially harmful, especially from an ecological point of view,
– provide goods and services in unprofitable areas as well as environmentally friendly goods and services,
– accept responsibility for economic and social development and the quality of life.

A significant area of activities undertaken within the framework of CSR implementation should be protection of the natural environment. The respondents were asked about the importance of environmental protection in the concept of corporate social responsibility (Table 3).

Table 3 **The position of environmental protection in the concept of corporate social responsibility in the opinion of the respondents**

Specification	N=200	%
definitely important	63	31.5
rather important	71	35.5
difficult to say	15	7.5
rather not important	42	21.0
definitely not important	9	4.5
Total	200	100.0

Source: Author's own study based on research conducted.

According to 31.5% of respondents, the position of environmental protection in the concept of corporate social responsibility is definitely important, and for 35.5% it is rather important. Slightly over a quarter of the respondents recognized that this issue is not important in the context of CSR. 7.5% of respondents refrained from a specific response.

Another aspect of the research was the position of economic aspects in the concept of corporate social responsibility (Table 4).

Table 4 **The position of economic aspects in the concept of corporate social responsibility in the opinion of the respondents**

Specification	N=200	%
definitely important	41	20.5

Specification	N=200	%
rather important	57	28.5
difficult to say	23	11.5
rather not important	56	28.0
definitely not important	23	11.5
Total	200	100.0

Source: Author's own study based on research conducted.

20.5% of the respondents recognized economic aspects as definitely important in the concept of CSR, whereas 28.5% as rather important. It was considered rather unimportant by 28%, and 11.5% of the respondents stated it was definitely not important. Another 11.5% of the respondents answered 'difficult to say'.

Table 5 **The position of social aspects in the concept of corporate social responsibility in the opinion of respondents**

Specification	N=200	%
definitely important	52	26.0
rather important	57	28.5
difficult to say	27	13.5
rather not important	46	23.0
definitely not important	18	9.0
Total	200	100.0

Source: Author's own study based on research conducted.

The position of social aspects in the concept of corporate social responsibility (Table 5) was considered important by 26%, and 26.5% considered it rather important. A large part of the respondents (32%) considered this aspect of CSR as not important, and 13.5% did not have an opinion in this matter.

The analysis of tables 3-5 shows that the idea of CSR is most often understood among businesspeople as activities for protection of the environment and activities for the benefit of the local community. The position of economic aspects had a slightly lower rank in the opinion of the respondents.

It is important that the CSR concept be a daily practice in agribusiness companies, not just theory. The respondents were asked about the state of implementation of corporate social responsibility (Table 6).

The concept of corporate social responsibility has been fully implemented in 20% of the surveyed enterprises, and in 18% of companies it is under

implementation. In turn, 23% of enterprises plan to implement CSR activities. For 27.5% of the surveyed companies, this is only a theoretical concept that has no chance of implementation. The remaining 11.5% did not have a precise opinion on this matter.

Table 6 **The current state of implementation of corporate social responsibility in the surveyed business enterprises**

Specification	N=200	%
CSR has already been fully implemented	40	20.0
CSR is under implementation	36	18.0
the implementation of CSR is planned	46	23.0
this is only a theoretical concept that has no chance of implementation	55	27.5
difficult to say	23	11.5
Total	200	100.0

Source: Author's own study based on research conducted.

According to M. Smolarek and M. Sipa (2015), taking actions within the scope of corporate social responsibility by small and medium-sized enterprises depends mainly on the businessperson-owner, their knowledge, skills and experience, and in particular their system of values.

Table 7 **Benefits resulting from the introduction of the concept of corporate social responsibility in the opinion of the respondents**

Specification	N=200	%
improvement of the company's image	72	36.0
conservation of natural resources for future generations	66	33.0
cost reduction in the enterprise	18	9.0
increase in the company's competitiveness	88	44.0
increased commitment and motivation of employees	60	30.0
better relations with stakeholders	94	47.0

* the respondents could choose more than one answer
Source: Author's own study based on research conducted.

The implementation of the concept of socially responsible business implies many benefits. M. Sznajder (2013) writes extensively about this. The respondents indicated relations with stakeholders (47%) in the first place, then the increase in

the competitiveness of the company (44%), as well as improvement of the company's image (36%). Conservation of natural resource for future generations was also considered to be a significant benefit (33%). In the respondents' opinion, the less important benefits include the increase in commitment and motivation of employees (30%) and the reduction of costs in the enterprise (9%).

Table 8 **Factors that constitute a barrier to implementing corporate social responsibility in the surveyed agribusiness enterprises**

Specification	N=200	%
lack of management's awareness of CSR issues	18	9.0
lack of employees' awareness	22	11.0
identifying CSR as only philanthropic activity	28	14.0
associating the idea of CSR with large and rich companies	98	49.0
difficulty defining CSR	55	27.5
linking CSR with the necessity to incur large financial outlays	110	55.0
the belief that there is no link between CSR activities and the company's market success	131	65.5
lack of awareness that the CSR strategy provides a long-term economic profit	73	36.5

* the respondents could choose more than one answer
Source: Author's own study based on research conducted.

Another question in the study of corporate social responsibility of agribusiness in the context of sustainable development concerned the barriers to implementing CSR (Table 8). As the most significant barrier, the respondents considered (65.5%) the belief that there was no link between activities in the area of socially responsible business and the company's market success. This has also been confirmed by research by D. Zuzek (2012), where about 30% of the respondents gave the same response.

In the views of the respondents, linking CSR with the necessity to incur large financial outlays (55%) is a significant barrier. An important threshold, according to 49% of the respondents, is also associating the idea of CSR with large and rich companies. It should be noted that such views stop small and medium-sized agribusiness companies from implementing CSR, although they largely affect the shape of the local market and interact with the community and the natural environment (Witek-Crabb, 2004). In the opinion of the respondents (36.5%), another barrier is also the lack of awareness that the CSR strategy provides a long-term economic profit. This is also mentioned in research by I. Codogni (2012).

4 Conclusion

To sum up, social responsibility of agribusiness enterprises is the response of this economic sector to the challenges set by the concept of sustainable development. Both ideas have many common points and thus they overlap. Thanks to the minimization of negative impact on the external environment by agribusiness companies and the consideration of social and environmental aspects while conducting business, it can be concluded that they operate in accordance with the concept of sustainable development.

The respondents indicated that they were familiar with the term "corporate social responsibility". They also identify this concept with the idea of sustainable development, which is a correct observation, although sustainable development should be considered a much broader issue than corporate social responsibility.

In the conducted research, the idea of CSR was most often understood among entrepreneurs as activities for protection of the environment and activities for the benefit of the local community. The position of economic aspects in the opinion of the respondents had a slightly lower rank. The respondents do perceive a wide range of benefits brought by the implementation of the CSR idea. As the basic barrier in the implementation of CSR, the respondents recognized the belief that there is no link between CSR activities and the company's market success and the linking of CSR with the necessity to incur large financial outlays.

Generally, the research has shown that the state of knowledge of CSR and sustainable development is quite high, however daily practice in agribusiness enterprises in this respect is slightly different from the theory and knowledge, and their activities in this area are still significantly limited.

Acknowledgements

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DEVELOPMENT OF METHODOLOGICAL BASE FOR EFFECTIVENESS OF MANAGEMENT CONSULTING EVALUATION

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Abstract

The developing theoretical managerial concepts and applied managerial techniques comprise the basis for the modern innovative management of an agricultural enterprise. Management consulting occupies a special place in the managerial process. It is aimed at rendering expert support to the specialists of an economic entity as well as developing recommendations for promotion of activity efficiency in the enterprise on the basis of theoretical and applied knowledge in the field of management. Complicated conditions for activity carried out by the Russian agricultural commodities manufacturers cause the necessity in the real managerial activity integration with the scientific research works in the field of management. Hence, the necessity occurs in professional management consulting considering technological features of production process and scientific basics of management. The article considers the economic essence of management consulting, offers its conceptual model and methodological instruments, as well as develops the system of key indicators of social-economic activity efficiency as an instrument of management consulting.

Keywords: *key indicators of efficiency, methodological tools,management, management consulting.*

JEL classification: *J2, M, Q5*

1   Introduction

The current state of management consulting as one of the professional activity types is characterized by the emergence of innovative management procedures, methods and tools, which are construed as one of the competitive advantages types and the main factor contributing to the strategic, tactical and operational activity effectiveness. At the same time, there is a certain terminological discrepancy between the framework of categories, insufficiently substantiated structuring of key components, and an uncertain relationship with other economic sciences in management consulting as a field of scientific knowledge. In this connection, there occurs a necessity in the development and justification the conceptual foundations for management consulting that could correspond to the current trends in the development of economic science.

1.1   Economic content of management consulting

Management consulting is a professional assistance in economic processes management provided by specialists to managerial staff and heads of various enterprises in the subject areas of their interests, concerning the analysis and solution of issues and/or problems of their development and operation (in the area of financial and economic management, strategic planning, forecasting, optimization and improving the efficiency of the organization), which are implemented in the form of services (recommendations, advice and management decisions jointly developed with the client) (Apenko S.N., & Shavrovskaya M.N., 2012).

The following main features typical for management consulting are distinguished in the literature: management consulting is aimed at introducing certain changes in the structure of financial and economic activity of the organization; management consulting is carried out by highly qualified specialists in conjunction with the management of the organization; management consulting is aimed at improving the organization efficiency; management consulting is characterized by a complex nature consisting of various activity lines of the organization transformation (Yusupova O.A., 2006).

Having studied the variety of interpretations, it is possible to specify the "management consulting" definition essence taking into account the current conditions of economic development. Management consulting is a set of interrelated

procedures aimed at providing professional support to the company management in strategic development for achievement of competitive advantages and in solving managerial and production issues in conditions of limited resources and uncertainty of economic situations, as well as taking into account the measures for their practical implementation based on the analysis of economic data on its internal and external environment.

1.1.1 Main directions of management consulting

One should distinguish strategic, tactical and operational consulting depending on the objectives pursued by management consultants, rendering assistance to the business leaders in the process of developing systemic and integrated solutions to the issues connected with management organization of complex systems in different areas of activity.

Strategic management consulting is aimed at providing consulting assistance to the company management in assessing the external environment in order to find and effectively use the internal opportunities in achieving a sustainable competitiveness of the enterprise in the long term perspective. Tactical management consulting is designed to provide in consulting support in identifying means enabling business leaders to transform their strategic plans, goals and decisions into activities of the executive staff. Operation management consulting is based on the information feedback property and is aimed at creating conditions for rapid response of managers to significant deviations of the actual data from the planned one.

2   Data and Methods

When formulating a conceptual model, it is necessary to formulate properly, identify system-forming elements and develop practical implementation techniques aimed at improvement the efficiency of the company operation, including its purpose, functions, tasks, object, subject, methods, principles and tools.

The proposed model highlights, conceptually specifies and structures elements forming theoretical basis of the modern concept of management counseling (Figure 1).

The objective of management consulting, in accordance with the author's concept, is to conduct certain consulting, analytical and research work related to the substantiation of development prospects and application of organizational, economic, scientific, technical and methodological innovations, taking into account the needs of the economy and the management of commercial and non-profit organizations, regardless of their size, organizational and legal form and industry

affiliation (Antonchenko N.G.&Kalenskaya N.V., 2014; Kolbina A.D. & Chumarina G.R., 2016).

The main tasks of management consulting are defined in the above description as follows:

- forecasting and analysis of environmental conditions affecting the enterprise operation, with the purpose of selecting, implementing and evaluating the efficiency of the enterprise's competitive development strategy (Gorman G.G. & McCarthy S., 2006; Klychova G.S., Ziganshin B.G., Zakirova A.R., Valieva G.R. & Klychova A.S., 2017);
- evaluating of internal processes and resources of the enterprise, which form its potential, for exercising control and increasing the efficiency of their use (Huning S., Naumann M., Bens O., & Hüttl R.F., 2011; Sergeeva I., 2015);
- providing of certain methods and tools to the client for carrying out organizational diagnostics of the company's state, solving the identified problems, elaborating strategic plans for the organization development (Klychova G.S., Zakirova A.R., Mukhamedzyanov K.Z., Sadrieva E.R., & Klychova A.S., 2017; Kalenskaya N.V., & Shafigullina A.V., 2014);
- rendering assistance in acquiring special knowledge (in particular, in forecasting of economic situation, situation analysis), mastering methods used in the process of identifying problems and implementing changes (the so-called training consulting).

Figure 1 **Conceptual model of management consulting**
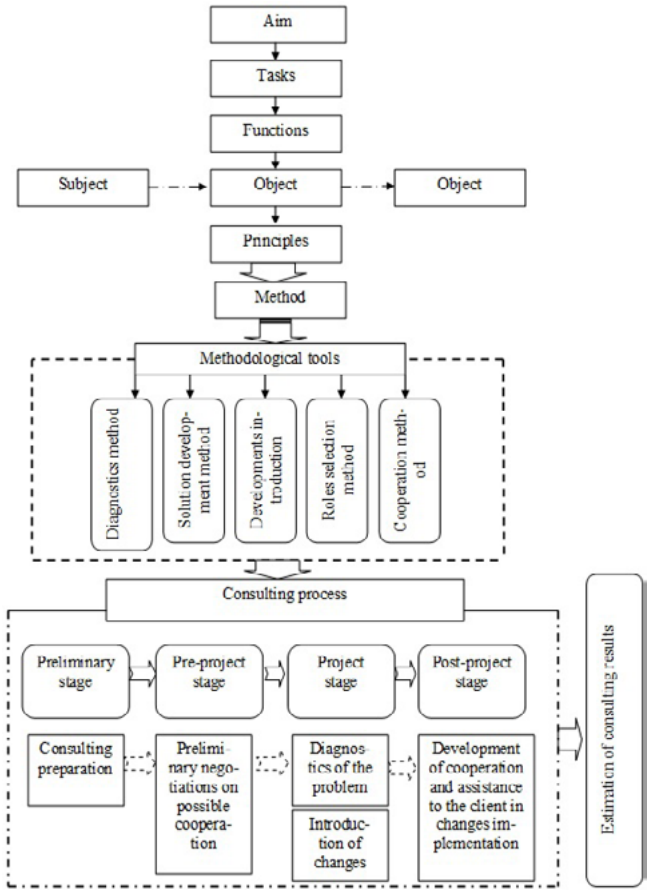
Goals and objectives of management consulting determine its functions. The following functions of management consulting can be distinguished: analytical; planning-forecasting; consulting; controlling; coordinating.

One of the key elements of the management consulting system is the integrity of its matter, objects, subjects and their interrelation. The object of management consulting is the object of management as a special type of labor activity. The subject of management consulting is a management consultant or a manage-ment consulting specialist with special knowledge and practical skills who fulfills the activity of the client's company performance improvement (Klychova G.S.,

Zakirova A.R., Mukhamedzyanov K.Z. & Faskhutdinova M.S., 2014; Klychova G.S., Faizrakhmanov D.I., Zakirova A.R. & Sadrieva E.R., 2014).

The matter of management consulting is the method of introducing managerial and economic knowledge into the company practical activity. The main specific matter of consultation is the process of production and sales of products, the so-called "consulting service".

The consultant's activity is based on the initial provisions of management consulting, which are enshrined in its principles. Moreover, it should be noted that, depending on the management consulting directions at different time levels, the consultants may be subject to additional requirements that act as particular principles. Thus, the principles of management consulting are as follows: legitimacy; scientific character; sustainability; flexibility; dynamism; professional competence; timeliness; safety of the system; upgrading ability; responsibility; efficiency.

The modern system of management consulting uses various tools and methods, both private and borrowed, integrating them depending on the tasks to be accomplished.

Based on the conceptual approaches to management consulting, each company forms a separate methodological toolkit providing assistance to the head of the client organization in diagnosing, analyzing and settlement of practical production and management problems. Methodological tool of management consulting represents a complex mechanism for integration and coordination of individual tools, the variable application of which contributes to the achievement of the set goals (Klychova G.S., Zakirova A.R., Zakirov Z.R. &Valieva G.R., 2015; Fakhretdinova E.N., Klychova G.S., Klychova A.S.&Antonova N.V., 2015). The tool is a means of practical implementation of its methods.

In accordance with the above conceptual model of management consulting, the following groups of methods can be distinguished: diagnostic methods, methods of problem solution, method of developments implementation, method of the roles for a consultant and a client selection, methods of cooperation and assisting a client in changes implementation (Boeger, N., Murray, R., & Villiers, C. (Eds.), 2008).

In the process of consulting, the consultant performs joint activities with managers and specialists of a client's organization. Efficient approach to organization of management consulting affects the efficiency of the resources application, as well as the achievement of necessary results, the quality of the expected changes, and further successful cooperation of the parties. The consultation process includes the following stages:

- The preliminary stage is based on the awareness on the part of the company management team of the problems existence and the need in their resolving

through the outside consultant. This stage is dedicated to collecting and analyzing information on consultants, their services, and cooperation conditions;

- Pre-project stage. At this stage, negotiations are held between a consultant and a client-company on possible cooperation and possible ways of resolving them. At the pre-project stage, training and consulting activities (seminars, exhibitions, conferences) with the participation of future clients and consultants are effective;

- Project stage. At this stage, the consultants carry out diagnosing of the client's company, collect data and form a comprehensive picture of the organization's vital activity for analyzing data on the organizational, technical, financial and economic status, as well as prospects for the enterprise development (Klychova G.S., Ziganshin B.G., Zakirova A.R., 2017). The project phase is completed with the implementation phase;

- Post-project stage. At this stage, the completed work is evaluated, and the actual results are compared with the planned ones, deviations volume and the reasons for their occurrence are analyzed, additional corrective measures are carried out, a report is made on the fulfilled work and an acceptance - delivery certificate is signed.

After the completion of a specific task, the consultant and the client company can agree upon continuation of working relations. In particular, if the necessity of cooperation with the client prolongation is found in the process of the task performance assessment, the consultant may continue his work, as indicated in the final report. In addition, there may occur a need in identification and solution of new emerging issues in the company's production and financial activity.

3   Results and Discussion

One of the main reasons for using consulting in a company is the expected positive economic effect, as the client is interested in the quality of the result, but not the process of counseling. However, it should be borne in mind that the result obtained from the implementation of the consulted project can be under the influence not only of the consultant, but also of the client himself. In assessing the quality of the advisory work, the following factors are taken into account: macro and microenvironment as well as the specific situation in the company itself; qualification, personal experience, goals and motivations, personal qualities of the consultant; experience, worldview, personal qualities of the client.

It is advisable to apply a system of key performance indicators for evaluation of management consulting efficiency.

At the present stage of economic reforms KPI (Key Performance Indicators) is one of the main tools for assessing the efficiency of production, elaborating a development strategy based on this assessment, monitoring and control of the employees business activity, of structural units and the enterprise as a whole (Lee, M. 2011; Luneva E.V., Filinova N.V., Filinov V.P. & Pogodina O.N., 2015). Using the Key Performance Indicators system, the current situation is analyzed in a strategic perspective, and each employee can objectively evaluate his contribution into the implementation of the company's development strategy. The KPI system, being a flexible management tool, can vary depending on the objectives of the enterprise. In modern production, in addition to determining the management personnel efficiency, KPI is used in the management of business processes. This is due to the fact that the KPI system includes direct indicators of efficiency, effectiveness, productivity of business processes (Strelnik E.U., Usanova D.S. & Khairullin I.G., 2015, Strelnik E.U., Usanova D.S., Khairullin I.G., Shafigullina G.I. & Khairullina K.T., 2017).

The Key Performance Indicators allow us to establish the causal connections between the targets and the set parameters for determining the patterns and mutual factors of influence on financial and production activity, identifying the dependence of some indicators on the other ones (Nizamutdinov M.M., Klychova G.S., Mavlieva L.M. & Safiullin L.N., 2014; Faizrakhmanov D.I., Klychova G.S. & Khametova M.V., 2014). The development and implementation of Key Performance Indicators system is caused by the need to ensure transparency and measurability of the business, and the opportunity for developing optimal management decisions.

Since Key Performance Indicators are the basis of a balanced scorecard, then, the present system should determine the methods to be used at their formation.

The balanced scorecard system (unlike the usual assessment of the company's activity, which considers only financial indicators and does not allow a timely response to changes in the internal and external environment of operation) allows to evaluate the organization in four directions: "Clients and marketing", "Business processes", "Personnel and Systems", "Finances" (Rompho N., 2011; Niven P., 2012).

The difficulty in assessing the advisory activity is that it is not always possible to clearly express quantitative results and determine the share of the consultant due to the influence of a number of factors on the consultation process.

In this regard, we propose to evaluate the management consulting process in terms of the benefits received by the consultant and the client in four interrelated blocks: finance, market, business processes and employees with determination of their qualitative and quantitative component.

In addition, in our opinion, in assessing the effectiveness of management consulting it is necessary to take into account its innovative development and social component. At the enterprises of the agro-industrial complex, the development and implementation of human resources, the formation of environmental sustainability and the implementation of socially significant projects form the basis of social efficiency (Conceição Pequito Teixeira, 2013; Klychova G.S., Ziganshin B.G., Valiev A.R. & Zakirova A.R., 2017; Nezhmetdinova F.T., 2009; Fayzrakhmanov D.I., Nezhmetdinova F.T., Ziganshin B.G. & Valiev A.R., 2013) .

Innovative development of the company implies an increase in energy efficiency (Kashapov I.I. & Ziganshin B.G., 2017); increase in the ecological compatibility of production; mastering of new production technologies (Valiev A.R., Safin R.I., Semushkin N.I. & Ziganshin B.G., 2012; Ziganshin B.G., Valiev A.R. & Hamidullin N.N., 2008) creation and development of research infrastructure; improving of innovation activity and business processes management (Fayzrakhmanov D.I. & Karimov T.R., 2011; Fayzrakhmanov D.I. & Edilbaev N.B., 2014).

In the process of human resources development and realization, it is necessary to take into account the harmonious individual development of each employee's, his qualifications, flexibility and mobility, a favorable social climate, social activity and improvement of the whole way of life (Conceição Pequito Teixeira, 2013; Klychova G.S., Zakirova A.R. & Kamilova E.R., 2016, Klychova G.S., Ziganshin B.G., Zakirova A.R., Valieva G.R. & Klychova A.S., 2017; Nezhmetdinova F.T., 2007). These factors have a direct impact on the labor quality. Key indicators for assessing the development and realization of human resources are presented in Table 1.

Table 1 **Indicators of development and realization of human resources assessment**

Indicator	Calculation method	Before carrying out management consulting	After carrying out management consulting
$\sum3_{ППК1р}$ Costs for retraining and qualification upgrading per one employee, thousand rub. per one person.	$\sum3_{ППК1р} = \sum3_{ППК} \div N$ where, $\sum3_{ППК}$ – total costs for retraining and qualification upgrading, thousand rub. N – number of employees in organization, people	12,5	13,4

Indicator	Calculation method	Before carrying out management consulting	After carrying out management consulting
$\sum N_{ппк}$ Number of employees, who passed retraining and qualification upgrading, people, including: workers specialists managers	$\sum N_{ппк} = N_{ппкр} + N_{ппкс} + N_{ппкрук}$ $N_{ппкр}$ - Number of workers, who passed retraining and qualification upgrading, people. $N_{ппкс}$ - Number of specialists, who passed retraining and qualification upgrading, people $N_{ппкрук}$ - Number of managers, who passed retraining and qualification upgrading, people	34	38
$ЧО_{1чел}$ Number of training hours per one employee hours per one person	$ЧО_{1чел} = (ЧО_{общ} - ЧО_{обяз}) \div N$ $ЧО_{общ}$ – Number of training hours (internal external) for the reporting period, hour $ЧО_{обяз}$ Number of obligatory training hours for the reporting period, hour N – number of employees in the company, people.	24	32
$Q_{ппк}$ Share of employees, who passed retraining and qualification upgrading, in the total number of employees, %	$Q_{ппк} = N_{ппк} \div N \times 100\%$ $N_{ппк}$ – Number of employees, who passed retraining and qualification upgrading, people N – Number of employees in the company, people	26	28
$Q_{сг}$ Volume of additional social guarantees, thousand rub.	$Q_{сг} = \sum C_{сг}$ $\sum C_{сг}$ – total amount of funds actually spent for, additional social guarantees	4582	4891

In the process of environmental efficiency assessment, the management of the enterprise is provided with reliable information that allows it to determine whether the ecological efficiency complies with the set parameters, and what potential opportunities are available for improvement of environmental protection. It is also necessary to take into account that environmental problems are closely interrelated with social conditions, efficient management and sufficient financing

(Safiullin L.N., Klychova G.S. & Klychova A.S., 2014, Nezhmetdinova F.T., 2013; Kashapov I.I. & Ziganshin B. G., 2017). Indicators of environmental sustainability are used for this purpose. (Table 2).

Table 2 **Indicators of environmental sustainability formation**

	Indicator	Calculation method	Before carrying out management consulting	After carrying out management consulting
	$V_{эбпп}$ Amount of funds allocated by the enterprise for organization of environmentally safe production activity, thousand rub. per production unit	$V_{эбпп}=\sum З_{эбпп} \div q$ $\sum З_{эбпп}$ - amount of funds allocated by the enterprise for organization of environmentally safe production activity, thousand rub. q– volume of manufactured products	18,6	20,4
2.	$V_{очс}$ Amount of funds allocated by the enterprise for waste disposal facilities construction, thousand rub. per production unit	$V_{очс}=\sum З_{очс} \div q$ $\sum З_{очс}$ – amount of funds, funds allocated by the enterprise for waste disposal facilities construction, thousand rub. q– volume of manufactured products	7,2	8,6
3.	$V_{звс}$ Volume of pollutants discharge in value terms, tons/thousand rub.	$V_{звс}=M_{зв} \div \sum З_{общ}$, где $M_{зв}$– volume of pollutants discharge, tons $\sum З_{общ}$ – total value of costs for manufacturing and sales of products	0.0009	0.00084
4.	$V_{ссвс}$ Volume of waste water discharge in value terms, Thousand m^3 / thousand rub.	$V_{ссвс}=M_{зв} \div \sum З_{общ}$, where $M_{зв}$– Volume of waste water discharge, tons $\sum З_{общ}$ – total value of costs for manufacturing and sales of products, thousand rub.	0. 00011	0.0001

	Indicator	Calculation method	Before carrying out management consulting	After carrying out management consulting
5.	V_{oc} Volume of wastes in value terms, tons / thousand rub.	$V_{oc} = M_o \div \sum 3_{общ}$, where M_o – volume of wastes, tons $\sum 3_{общ}$ – total value of costs for manufacturing and sales of products, thousand rub.	0.0056	0.0049
6.	Number of successfully realized projects for environmental protection	$K_{пзос}$	2	3

In the process of socially significant projects realization, the management of the enterprise solves the most important social problems, ensures achievability of the set goals for additional social security of employees and rational implementation of social policy based on the observance of social partnership principle (Table 3).

Table 3 **Indicators of socially important projects realization**

	Indicator	Calculation method	Before carrying out management consulting	After carrying out management consulting
	INV_{ooo} Sum of investments in the objects of environmental protection, thousand rub.	$INV_{ooo} = \sum 3_{oooc}$ $\sum 3_{oooc}$ – cost of investments in the objects of environmental protection, thousand rub.	4361	4768
	$INVc$ Investments in the community, thousand rub.	$INVc = \sum(3_б + 3_{ои} + 3_{фсп})$ $3_б$ = charity costs, thousand rub. $3_{ои}$ = public infrastructure development costs, thousand rub. $3_{фсп}$ = social programs funding costs	2984	3289

	Indicator	Calculation method	Before carrying out management consulting	After carrying out management consulting
3.	$V_{псн}$ – volume of funds allocated for support of socially unprotected society segments, thousand rub./ unit of production	$V_{псн} = З_{псн} \div q$ $З_{псн}$ – sum of costs for support of socially unprotected society, thousand rub. q– volume of manufactured products	1638	1745
4.	$V_{пжкх}$ - volume of funds allocated for support of housing and utilities sector and objects of cultural and historical value, rub./unit of production	$V_{пжкх} = З_{пжкх} \div q$ $З_{пжкх}$ – sum of costs allocated for support of housing and utilities sector and objects of cultural and historical value, thousand rub. q– volume of manufactured products	14,90	16,85
5.	$V_{сзм}$- volume of funds allocated for support of socially important events, rub./ unit of production	$V_{сзм} = З_{сзм} \div q$ $З_{сзм}$ – sum of costs allocated for support of socially important events, thousand rub. q– volume of manufactured products	21,12	23,56
6.	$V_{ба}$ - volume of funds allocated for holding charity events, rub./ unit of production	$V_{ба} = З_{ба} \div q$ $З_{ба}$ – sum of costs allocated for holding charity events, thousand rub. q– volume of manufactured products	12,1	14,8
7.	Number of charity projects held with participation of the client	$K_{бп}$	4361	4768

It is possible to draw conclusions about the effectiveness of management consulting upon comparing the key indicators before and after its performance. Thus, analyzing the data in the Tables 1-3, it will be possible to conclude that management consulting resulted in the increase in indicators characterizing the

development and implementation of human resources, formation of environmental sustainability and the effectiveness of implementing socially significant projects. For example, the costs associated with retraining and qualification upgrading of one employee as well as the amount of additional social guarantees increased by 7.2% and 6.7% respectively; the number of employees who passed retraining and qualification upgrading increased by 11.8%. Analyzing the Table 2, one can see the increase in the amount of funds allocated by the enterprise for the purpose of environmentally safe production activity maintaining and for the construction of treatment facilities and the reduction of pollutants emission, water and wastes discharge. This fact indicates that after conducting management consulting the enterprise has fully utilized the available potential for environmental performance improvement. The data in the Table 3 indicate an effective solution of the most important social problems, ensuring the achievement of the goals set for the additional social security of workers and the rational implementation of social policy. Thus, the amount of investments into the environmental protection objects as well as investments into the community has increased by 9.3% and 10.2%, respectively; the amount of funds allocated to the support of socially unprotected strata of the population, to support of housing and communal services and cultural objects of historical significance, to support of socially significant events and charity events has increased by an average of 15%.

The advantage of applying these key performance indicators is as follows: systematic approach to the analysis of activities, as the used indicators reflect key factors in increasing management efficiency; the analysis gives evaluation of the dynamics and changes in key indicators, making it possible to analyze both effective and unprofitable companies on the basis of the unified criteria; the methodology assumes calculation of various indicators: natural and value, qualitative and quantitative. This technique allows any organization to assess the real management efficiency of production and financial activity.

4   Conclusion

Thus, to evaluate the efficiency of management consulting, it is advisable to apply the KPI system, which provides an opportunity for a comprehensive assessment of the management consulting results in qualitative and quantitative terms, both for the client company and for the consultant. With the help of complex analysis, it is possible to assess the real efficiency of management consulting, determine the best organizational forms, methods, technologies of certain objects management for the achievement of determined economic results by the managed system.

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SESSION 6

FINANCE AND CURRENT ISSUES

SYNTHETIC MEASURE OF THE SPATIAL DIVERSITY IN THE FINANCIAL SITUATION OF THE EASTERN WALL POVIATS IN POLAND

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Abstract

In the conditions of globalization processes, the polarization of local development deepens. Environmental resources, infrastructure, financial capital, etc, should be mentioned among the factors that maintain this diversity. The process of an individual's activity or its development takes place in many spheres of the internal and external environment. They are interdependent and should be considered together. The purpose of the poviats' activity is to provide the best conditions for the functioning and development of the local community. The implementation of this objective requires ensuring a constant inflow of funds necessary to finance the appropriate level of public goods and services necessary to meet the needs of these communities and development projects. The aim of the study is to assess the level of local disproportions in the financial situation of the poviats of the Eastern Poland macro-region by means of a synthetic measure. 101 poviats were the research subjects. The source material was data from the Local Data Base of the Central Statistical Office (for 2010, 2012 and 2016). The synthetic measure is intended to support the decision-making process of local government units. In the analyzed period, the best units were the poviat of Kielce, Olsztyn and Krosno, while the weakest were the city of Chełm, Elbląg and Mrągów poviats. Poviats changed their position in time and space.

Keywords: *synthetic measure, financial situation, poviat, Eastern Poland*

JEL classification: *H41, H7; H72; H83*

1   Introduction

In the conditions of globalization processes, the polarization of local development deepens. The causes of the deepening economic and social disproportion are changing (Marcysiak and Prus, 2017). It is influenced by new management methods and especially endogenous potential. The process of fiscal decentralization, accompanied by measures to improve the quality of government, would be an effective strategy for reducing regional inequalities (Kyriacou, Muinelo-Gallo, Roca-Sagalés 2017; Oplotnik & Brezovnik, 2004). Building a competitive region is not a quick process, there are no fixed and unambiguous measures that represent the best level of development (Czudec 2010).

The local economy system changes over time, the system of values and the institutions changes along with the degree of meeting the needs. Regional development is perceived as an economic process involving the transformation of external and internal factors and regional resources into goods and services. It can take place both through diffusion from well-developed areas to weaker areas, as well as polarization of areas (Pawlik 2011, pp. 60-70). It is stimulated by the so-called growth poles. These can be local communities (Domański 2006). An important resource of the region is territorial capital (financial, social, human, etc.), which can significantly affect its competitiveness on a local and supra-local level (Kosiedowski 2001, p. 29; Prus and Drzazdzynska, 2017).

The main function performed by local authorities is to perform public tasks. Their scope reflects the degree of decentralization. The guarantee of their implementation is the appropriate economic potential of individual local government units. The implemented activity of territorial self-government is a multidimensional phenomenon taking place in many parallel spheres, i.e. economic, financial, social, social and ecological (Gorzelak, Płoszaj, Smętkowski 2006). These elements shape processes in the studied area. They are also connected with a set of potentially more or less tangible benefits resulting from the location of a given local government unit in a specific local and regional system. They shape a kind of premium of an attractive location. They represent the potential to be perceived and used in the process of local development (Ossowska, Poczta 2013, pp. 187-195).

Intensive changes in the needs of the local community, in the conditions of globalization and European integration, force the process of optimizing the division of income and expenditure in terms of their impact on the efficiency of functioning and responsibility of decisions. This is also to serve the effectiveness of the use of public funds in the process of achieving the goals of local authorities, allows to achieve maximum social usefulness (Oates 1999, Byrne 1994).

Local finances are an element of the public finance system, their role and place depend on the organizational structure and the degree of decentralization of public authority, the concept of financing local government, the degree of independence, sources of income and directions of spending, etc. The financial resources of poviats come from, among others the share in the state budget revenues (in the amount specified in the Act), subsidies from the state budget, income from poviat assets. They provide a guarantee of the quality and quantity of carried out tasks.

The finance prism allows to make a comprehensive assessment of the functioning of a given local government unit. Finance forms the basis for the implementation of public tasks and determines the conditions for local economic development (Wojciechowski 2012, pp. 234-235). The owned financial resources are the basis of the commune's activity and a condition for the implementation of statutory tasks related to, among others, solving local social problems, as well as undertaking effective and innovative activities closely related to the needs of its residents (Borodo 2007, p. 200). On the one hand, the financial situation is the objective of the entity's operation, and on the other hand, the result of earlier decisions. It is correlated with the level of local development (Sobczyk 2010).

2 Data and Methods

Financial processes influence the socio-economic development of both the country and local economies. It should be noted that regional and local development is a complex process, with a multidimensional character, including changes at various levels. It can be perceived in five elementary dimensions: financial, economic, infrastructural, environmental and spatial.

The aim of the study is to assess the level of disproportions in the financial situation of poviats and to indicate the feasibility of using a synthetic measure in this respect. The selection of variables for analysis resulted from substantive and statistical premises (coefficient of variation, reverse correlation matrix) and data availability. The empirical material for the analyzes was obtained from the Local Data Bank of the Central Statistical Office (BDL GUS). The subject of the study were poviats located in Eastern Poland (5 voivodeship of the eastern wall, 101 units), while the time scope of the analyzes covered 2010, 2012, 2016.

The complex nature of the financial situation means that effective analyzes in this respect should be carried out in a comprehensive manner. Selected variables (income from tax on individuals (PIT) and legal (CIT), subsidies, operating surplus, investment and health expenses, for security, for debt service), based on substantive, statistical or data availability criteria, are stimulant and destimulant (Grabiński, Wydymus, Zeliaś 1989).

Such a division is made by a substantive analysis supported by a correlation matrix. Variables - stimulants and destimulants should be positively correlated with each other, the correlation between the stimulant and destimulant should be negative. After distinguishing the nature of variables, one should take these factors that are statistically significant (Malina 2004). The variables were eliminated from the study due to the volatility index (> 0.15) and excessively correlated (according to the reversed matrix method of correlation coefficients) (Śmiłowska, 1997; Młodak, Józefowski, Wawrowski 2016; Wysocki 1996; Zeliaś 2000).

In the next stage, selected variables were subjected to the standardization procedure using the zero uni- formization method (Wysocki, Lira 2005). Stimulants were neutralized according to the formula:

$$Z_{ij} = \frac{x_{ij} - \min_i x_i}{\max_i x_i - \min_i x_i} \quad 1$$

while destimulant:

$$z_{ij} = \frac{\max_i x_i - x_{ij}}{\max_i x_i - \min_i x_i} \quad 2$$

where: i = 1,2, ... N; j = 1,2, ..., p (N is the number of objects (communes), and p - the number of features); Z_{ij} – is the value of the neutralizing feature for the unit being tested, xij - means the value of j of this characteristic for the tested unit, max - the maximum value of j of this feature, min - the minimum value of j of this feature (according to the zero uniformization method) (Wysocki, Lira 2005) .

The synthetic measure describing the financial situation was built on the basis of a non-standard method, using the formula:

$$S_i = \frac{1}{p} \sum_{j=i}^{p} =_{ij} (i = 1,2, \dots, p) \ (3)$$

where: s_i – synthetic measure in the period under consideration, z_{ij} – features of the synthetic index structure, p - the number of features. The indicator assumes a value between [0,1]. A value closer to unity means that the object is characterized by a high level of the analyzed phenomenon, while when the values are closer to 0 - the object is less well developed in the examined relation. It allowed to divide the studied population into four quartile groups (Dziekański 2016, pp. 79-91, Wysocki, Lira 2005, Tokarski 2005, Walesiak 2005, pp. 106-118).

Finally, the results were analyzed and the conclusions were formulated. A scatter graph of the synthetic measure was presented (Zeliaś, Malina 1997, Dziekański 2017, Dziekański 2016a, Kachniarz 2012).

3 Results and Discussion

The strategic place in the activity of territorial self-government is managed by public affairs. It covers issues such as conditions, mechanisms and principles of management of what is fundamental to the interest of the community. The process of a unit's activity or development takes place in a space that is completely filled by endogenous and exogenous factors (including especially natural resources and financial, social, human capital, etc.). The indicated process of poviats' functioning should be implemented comprehensively, in the direction enabling achievement of an integrated order binding for social, economic, environmental (ecological) and institutional order (Zaucha 2012). These processes concern the entire economy, all sectors, institutions, organizations, enterprises and the whole society (Dziekański 2014).

Existing development is a materialized foot print of earlier economic activities and there is more about that, for example, in Quality of life in cities (regions, poviats) that the state of municipalities and of regions is only partly a hostage of the regional investment economy and that a non-negligible way to success is paved by decision making processes especially through the use of certain decision criteria (Dlask, Beran 2016)

The development of the poviat as a process of quantitative and qualitative social and economic transformation depends on the actual participation of residents in local government processes and their proper use of financial resources. It is shaped by the financial situation. Its level is due to, among others, the ability to achieve budget balance, local authorities' activities in increasing assets, income and expenditure. Income is evidenced by the prudence of the poviat authorities, economic activity of residents. Expenditure contributes to improving the living conditions of residents and to overall socio-economic development. Poviats and cities with poviat rights have legal personality and create their own financial policy under the existing law. The high level of own income per capita (their high share in total income) favors a better satisfaction of the needs of residents and is the foundation for sustainable development. Own revenues form the main source of budget revenues of poviats (Głowicka-Wołoszyn 2017, pp. 96-105).

The basis for the operation of local government units and the condition for carrying out statutory tasks are financial resources. The development of appropriate tools in this area using quantitative methods and the ability to interpret

information based on this is the starting point for defining opportunities and development threats for a given unit (Satoła 2010).

A synthetic assessment of changes in the development assessment process indicates a different level of financial condition of the surveyed units. The value of the index ranged from 0.26 (the poviat of Chełm, Lublin province, Elbląg poviat, Warmian-Masurian Voivodeship) to 0.42 (Kielce, Świętokrzyskie Voivodeship) in 2010, from 0.22 (Chełm) to 0.38 (Olsztyn, Warmian-Masurian Voivodeship) in 2012, from 0.27 (Mrągowo, Warmian-Masurian Voivodeship) to 0.52 (in the city of Krosno, Podkarpackie Voivodeship) in 2016. Analysis of towns with poviat rights allowed to divide them into 4 groups. Between groups, one can observe shifts in time and space (Table 1).

Table 1 **Shifts in time and space between towns with poviat rights**

	2010	2012	2016
A	1 Kielce 0,42 2 Krosno 0,42 3 Olsztyn 0,42 5 Rzeszów 0,39 12 poviat of Staszów 0,35 15 poviat of Sejny 0,34	1 Olsztyn 0,38 3 Krosno 0,36 4 Rzeszów 0,36 9 poviat of Sejny 0,32 10 poviat of Staszów 0,32 13 poviat of Włodawa 0,32 22 poviat of Tomaszów 0,31 23 wysokomazowiecki 0,31 30 poviat of Kolbuszowa 0,3 39 poviat of Włoszczowa 0,3	1 Krosno 0,52 2 Olsztyn 0,45 3 Rzeszów 0,43 13 poviat of Sejny 0,34 14 wysokomazowiecki 0,34 30 poviat of Sokółka 0,32 31 poviat of Włoszczowa 0,32
B	35 poviat of Kolbuszowa 0,31 50 poviat of Sokółka 0,31 51 poviat of Tomaszów 0,31 52 poviat of Włodawa 0,31 53 poviat of Włoszczowa 0,31 54 wysokomazowiecki 0,31	42 poviat of Działdowo 0,29 68 poviat of Zamość 0,29	32 poviat of Działdowo 0,31 33 poviat of Kolbuszowa 0,31 37 Przemyśl 0,31 70 poviat of Staszów 0,3 71 poviat of Tomaszów 0,3
C	59 poviat of Busko 0,3 60 poviat of Działdowo 0,3 61 poviat of Ełk 0,3 62 poviat of Giżycko 0,3 74 poviat of Biała Podlaska 0,29	70 poviat of Busko 0,28 71 poviat of Giżycko 0,28 82 poviat of Sokółka 0,28	72 poviat of Busko 0,29 73 poviat of Giżycko 0,29 81 Chełm 0,29 92 poviat of Włodawa 0,29 93 poviat of Zamość 0,29

D	91 Przemyśl 0,28 92 poviat of Mrągowo 0,28 98 poviat of Zamość 0,28 100 poviat of Elbląg 0,26 101 Chełm 0,26	86 poviat of Biała Podlaska 0,27 95 poviat of Ełk 0,26 98 poviat of Elbląg 0,25 99 Przemyśl 0,25 100 poviat of Mrągowo 0,25 101 Chełm 0,22	94 poviat of Biała Podlaska 0,28 95 poviat of Ełk 0,28 100 poviat of Elbląg 0,27 101 poviat of Mrągowo 0,27

The synthetic measure was built based on income from PIT and CIT, subventions, operating surplus, investment expenses, health and safety expenditure as well as expenses on debt servicing costs (interest)
And very good; B good; C weak; D evil; The average value in the group and the number of units in the group; The position / powiat / value of the synthetic measure / poviats was separated according to 2016, the same poviat was presented in earlier years
Source: Own calculations based on CSO BDL data.

In 2016, compared to 2012, the diversification of communes due to the financial situation slightly increased (+0.03, in relation 2016 to 2010, increase +0.01). This confirms the value of the standard deviation, which in 2016 compared to 2012 is higher by +0.02 (0.04 - 0.02). This is particularly confirmed by the value of the range, which in 2016 was 0.25, higher than in 2010 (0.17) and 2010 (0.16). The stability of the medium-term financial stability may be indicated by the stability of the average synthetic measure (Table 2).

Table 2 **Classification of Świętokrzyskie voivodeship communes according to the measure of synthetic financial condition in 2010 and 2015.**

	2010	**2012**	**2016**
average	0,31	0,29	0,32
standard deviation	0,03	0,02	0,04
co-variation	0,10	0,08	0,12
min	0,26	0,22	0,27
max	0,42	0,38	0,52
gap	0,16	0,17	0,25
slant	2,79	3,44	8,3
measure of concentration-kurtosis	0,31	0,29	0,32

Source: Own calculations based on CSO BDL data.

The value of the correlation measure indicates a fairly stable spatial diversification of the financial situation of the poviats of Eastern Poland. The Pearson correlation coefficient was in the relation 2016 to 2012 - 0.617 and 2012 - 2010 - 0.700.

Table 3 **Correlation of a synthetic measure S_i and its changes**

	Gamma correlation coefficient	Sperman correlation coefficient	tau Kendall correlation coefficient	Pearson correlation coefficient
S_i - dS_{i2010}	0,215	0,229	0,190	0,164
S_i 2010-2012	0,504	0,533	0,437	0,700
S_i - dS_i2012	0,184	0,198	0,159	0,196
S_i 2012-2016	0,505	0,527	0,437	0,617
S_i - dS_i2016	0,244	0,264	0,211	0,078
S_i 2016-2010	0,502	0,542	0,435	0,724

Source: Own calculations based on CSO BDL data.

Analysis of the dispersion for the value of a synthetic measure - financial situation, indicates that the increasing value of coefficients is accompanied by a change in the position of points that are getting closer to the straight line in 2012 and 2016. The conclusion is that the measure based on the model method was subject to 2016 in relation to 2012, the increase (Pearson's correlation coefficients in the analyzed period of time amounted to r = 0.700 in 2010, in 2016 r = 0.617, Figure 1).

Figure 1 **Conformity of the results of synthetic measures year to year with adjustment of the regression line**
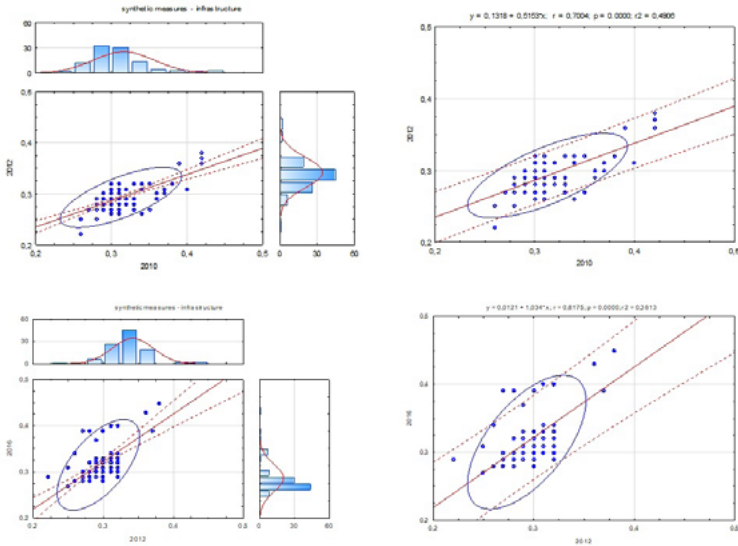
Source: Own study based on CSO BDL data.

4   Conclusions

The financial economy with the use of available funds may affect the competitiveness and innovation of the region. The size of individual activities (expenditures and incomes) depends on the direction and scope of the tasks (own and commissioned) to be carried out and the planned development. Most poviat activities require financing. Poviats by the financial economy have an impact on the distortion or improvement of the allocation of resources, incurring or not borrowing (public debt), which affects the level of savings and private sector investment, perception of the functioning of administration and quality of life.

Tracking multiple indicators through time affords administrators, regulators, investors and citizens a better picture of the financial situation of a locale in comparison to other similar locales at any point in time as well as a clearer indication of potentially troublesome trends (Kelso, Maggiotto 1981).

The position of local government requires care for the financial situation, which determines the efficiency of its functioning, i.e. the ability to meet current and future obligations within a certain time, scope and quality standard.

The source of the local authority (poviat's) income is its own income, which illustrates its self-government and independence. Investment expenditures are a factor characterizing development opportunities of local government units. Their growth is most often related to the growing needs and expectations of the local community, inhabiting the area of a given local self-government community (Sobczyk 2010, pp. 125-136).

The assessment of the financial situation, implemented in a comprehensive manner, allows to obtain information about the sources of financing local government activities, directions of its development or the use of public cash resources and fulfillment of duties towards the local community.

The synthetic measure is intended to support the municipality's decision-making process. It depends on the number and type of adopted variables to be tested. This information can be used by the authorities to assess the effectiveness of the development instruments used so far and the tools of financial management. It allows a comparison between the surveyed units, an indication of the weaker and better areas of the unit's operation, an assessment of the disproportions between the individual objects under study.

This information can be used by the authorities to assess the effectiveness of the development instruments used so far and the tools of financial management. The value of the indicator ranged from 0.26 to 0.42 in 2010, from 0.22 to 0.38 in 2012, from 0.27 to 0.52 in 2016. It is possible to observe shifts of the examined objects in time and space (which results from, for example, inflow of funds from EU funds, subsidies for the implementation of extraordinary events - floods).

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LOCAL OFFER OF PUBLIC SERVICES IN THE PERCEPTION OF MUNICIPALITIES' RESIDENTS

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Abstract

Providing local public services is the main task of municipalities as the basic units of local self-government. The aim of the article is to present and assess the opinions of residents about the quality of public services available in the area of their municipality. The source of empirical data was the results of own surveys carried out in the regions of southern Poland.

The respondents assessed the social services available in the municipality better than the municipal services provided by the technical infrastructure. The highest rates of the level of local public services were formulated by city dwellers, while lower scores were characteristic of rural areas. Local government authorities should take care of the quality of the local public services offer, as it is an important factor determining the standard of living of the local communities.

Keywords: *local public service, municipality, public utilities*

JEL classification: *H44, H75, H76*

1   Introduction

Both economic development and sustainable development must be implemented for the inhabitants of a given area, taking their expectations and local conditions into account (Wojewodzic, 2005). In this way, the role of the institutions that are best able to recognize and satisfy those expectations, to which the local and regional communities institutionalized in the form of local governments undoubtedly belong, is increasing. Therefore, the basic objective of the activities of local

government units in addition to the implementation of tasks in the field of public administration is the implementation of tasks aimed at satisfying the needs of the inhabitants (Kozera & Glowicka-Woloszyn, 2016; Dziekanski, 2017). These tasks are performed on their own behalf and on their own responsibility (Soukopová et al. 2014). Performing own tasks of the municipality means shaping the local offer of public services, which, by diversifying the living conditions in individual territorial units, also becomes a factor of competition for new residents and the location of enterprises (Cifranic, 2016).

An important element in shaping the scope and standard of the local public services offer is the opinion of the inhabitants of the municipalities (James, 2009). They constitute a group of basic users of these services (Merickova et al. 2015). The perception of public services is a factor shaping the assessment of the functioning of local authorities, and good opinions of the inhabitants reinforce the chances of their re-election.

The aim of the article is to present and assess the opinions of the residents about the quality of public services available in the area of their municipality.

2   Data and methods

The basic source of empirical data was the results of own surveys carried out in the regions of southern Poland. The research was carried out in 21 municipalities of the following provinces: Lower Silesian, Lesser Poland, Subcarpathian and Silesian. After verification, 168 correctly filled questionnaires were qualified for the analyses. The selection of respondents was purposeful and was designed in such a way as to ensure the representativeness in the sample of representatives of various age, profession, level of education and position in the local environment groups.

The questions contained in the questionnaire concerned various aspects of the quality assessment of individual public services and the condition of local infrastructure. In the questionnaire, which included 23 questions, the importance of investments implemented by municipalities to improve the quality of services was also assessed. Descriptive statistics methods (arithmetic mean, median, coefficient of variation, standard deviation) and the measure of interdependence of features were used for data analysis. Research and analyses were carried out using grouping of objects by type of territorial units for urban, rural and urban-rural municipalities.

3 Results and Discussion

The territorial self-government units or economic entities indicated by them (Warner & Bel, 2008; Wollmann, 2011) are responsible for shaping the local public services offer. Local public services, depending on the organizational and legal solutions adopted in the economy of a given country, may be provided by both the public and private sectors (Wollmann, 2014). The implementation of the New Public Management concept and the related economisation of public sector entities' activities has led to the trend to privatize many areas of the current state and self-government activity in many countries (Kuhlmann & Fedele, 2010). Privatization was intended to improve the efficiency of services and to reduce the expenditure of public sector entities. International experience, however, indicates that privatization processes have not achieved the intended effect everywhere. In some countries, in recent years, there has been recommunalization, i.e. the phenomenon of taking over the previously privatized tasks of the local self-government (Wollmann & Marcou, 2010; Swianiewicz, 2018).

According to research carried out in OECD countries, the level of decentralization of the country's territorial division is of great importance for the effective provision of public services (Ahmad et al., 2008). Residents of municipalities were asked to assess the degree of satisfaction with the public services provided at the local level (Figure 1).

Figure 1 **Summary of average ratings of satisfaction of the respondents with local public services**
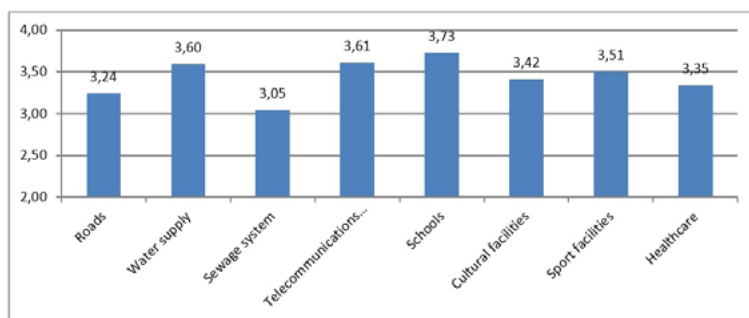
Rating scale: 1 - lowest, 5 - highest.
Source: Own research.

On average, the higher ratings of the residents were given to those public services which use social infrastructure facilities, while the implementation of

municipal services using technical infrastructure devices was rated lower. In the entire research group, the services of sewage disposal were rated the lowest, which is related to the underdevelopment of the sewage network, which is particularly visible in rural areas.

In order to more accurately assess the perception of local public services, a differentiation analysis was carried out using the municipality type as a grouping criterion (Table 1).

Table 1 **List of selected statistical measures for the assessment of public services by types of municipalities**

Specification	Roads	Water supply	Sewage system	Telecommunications network	Schools	Cultural facilities	Sport facilities	Healthcare
Urban municipalities								
Arithmetic mean	3,53	3,74	3,58	4,11	4,00	4,16	3,84	3,21
Median	4,00	4,00	4,00	4,00	4,00	4,00	4,00	3,00
Standard deviation	0,90	0,87	0,90	0,66	0,75	0,76	0,76	0,71
Coefficient of variation	0,26	0,23	0,25	0,16	0,19	0,18	0,20	0,22
Rural municipalities								
Arithmetic mean	3,52	3,61	3,14	3,77	3,87	3,32	3,54	3,55
Median	4,00	4,00	3,00	4,00	4,00	3,00	4,00	4,00
Standard deviation	1,19	1,20	1,40	0,97	0,85	1,10	1,15	1,14
Coefficient of variation	0,34	0,33	0,45	0,26	0,22	0,33	0,32	0,32
Urban-rural municipalities								
Arithmetic mean	2,67	3,52	2,70	3,17	3,39	3,33	3,33	3,04
Median	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
Standard deviation	0,91	0,88	1,28	1,15	0,96	0,93	1,05	1,13
Coefficient of variation	0,34	0,25	0,47	0,36	0,28	0,28	0,31	0,37

Source: Own research.

The assessment of the satisfaction of residents with individual public services was diversified due to the type of municipality that was responsible for providing them. Urban municipalities were characterized with the highest ratings by far.

The inhabitants of the villages and urban-rural municipalities assessed the quality of public services on a clearly lower level. The relatively lowest assessments characterizing urban-rural municipalities can be interpreted as a manifestation of the so-called small cities crisis. Development processes occur most dynamically in large cities, which become the location of many, especially large, business entities. These companies create jobs that attract residents of other, smaller cities and villages, causing migration processes (see Marcysiak & Prus, 2017; Ratajczak, 2000). The growth of cities signifies the need to create favourable conditions for residents demanding increasingly higher standards of public services.

On average, better results were obtained by public services that are provided in social infrastructure facilities. Representatives of local communities rated educational services as the best. It is worth noting that the assessments formulated in this respect were the least diversified, as evidenced by the lowest values of the coefficients of variation. This is the result of the fact that the scope and standard of these services is determined at the national level.

The largest differences in the level of satisfaction with locally supplied public services between cities and rural areas were recorded in the field of cultural services. There are many cultural facilities in the cities, and their offer is relatively extensive and diverse, while rural areas have been neglected in this respect for many years. In rural areas, a certain difficulty in this regard is also the small number of these facilities resulting partly from low population density and difficulties in using the cultural offer. This problem especially concerns areas with scattered development and poor public transport.

The relatively smallest differences in the level of public service ratings between different types of municipalities were recorded in the field of water supply. Satisfying the needs of the residents with regard to this element of technical infrastructure is already at quite a high level. This was achieved thanks to intensive investment activities conducted over the last dozen or so years especially in rural areas (Standar & Bartkowiak-Bakun, 2015). In this way, the level of water supply infrastructure in rural areas is only slightly lower than in the cities.

On the basis of the analysis of statistical measures of variation (standard deviation and coefficient of variation), the group of urban municipalities was the most internally homogeneous. In urban areas the infrastructure was developed earlier, which enables the performance of public tasks for local self-government units. For this reason, among others, the availability of public services is higher there (see Topa 2016), and their quality is more standardized.

Local infrastructure is of great importance for the standard of public services, that is why local authorities take efforts to meet higher and higher quality parameters. Investing in infrastructure is connected with incurring high expenditures

from local budgets, which in the situation of limited income of many municipalities in Poland causes the necessity to look for external sources of their financing. The EU funds were a source of financing for investment activities of local government units often used in the past several years (see Zawojska, 2009). The respondents were asked which elements of infrastructure in their municipalities gained the most thanks to co-financing from EU funds (Figure 2).

Figure 2 **Summary of the average assessment of benefits obtained from EU funds due to the type of municipality**
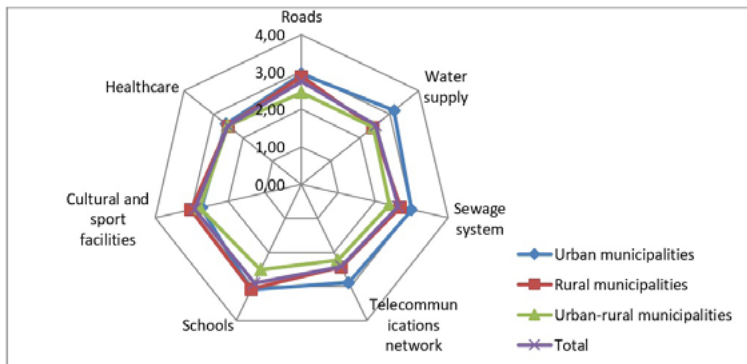
Rating scale: 1 – lowest benefits, 5 – highest benefits.
Source: Own research.

The analysis of the scope of support by the EU funds of the local infrastructure proved that the municipalities were the most beneficial. Their advantage was particularly evident in the field of technical infrastructure facilities. In the field of social infrastructure, differences between municipalities were much smaller, and in the case of health care institutions, the obtained assessments were almost identical regardless of the type of the municipality. It is worth noting, however, that when analysing all the assessed elements of technical and social infrastructure, the smallest scale of the benefits from EU funds was indicated by the inhabitants of urban-rural municipalities. Such an assessment of the significance of the European funds could have an impact on the previously discussed relatively lowest level of satisfaction with municipal services in the group of urban-rural municipalities.

In order to verify the potential relationships between the assessment of the importance of external funds for the development of infrastructure and the assessment of the local public services offer, a correlation analysis between these

variables was conducted. The correlation analysis showed the existence of moderately strong dependencies in the field of sewage disposal ($r_{xy} = 0.640$) and municipal roads ($r_{xy} = 0.516$). This proves that along with the increase in the use of EU subsidies, the number of positive assessments of the level of public services performed using the elements of infrastructure modernized from European funds increased in the municipality. Interestingly, the relatively high assessment of the importance of EU funds in the construction and modernization of schools as well as cultural and sport facilities did not lead to equally high correlation coefficients (respectively: $r_{xy} = 0.335$, $r_{xy} = 0.239$).

Such differentiation of correlation coefficients should be interpreted as follows. Inhabitants who assess the standard of local public services at a low level have high hopes in using EU funds and, consequently, obtaining the financial resources indispensable to finance the necessary investment activities. In their opinions, the acquired funds will contribute to a significant improvement of infrastructure, which determines the quality of the services provided. Higher ratings of satisfaction with local services are not accompanied by such a high expectations of improving their standard along with the use of external financial resources by the municipality.

4   Conclusion

The feature that distinguishes public services from other categories of services is their universal availability. The scope and standard of locally available public services determines the quality of life of the population and affects the conditions of locating and running a business. The quality of public services provided can therefore be a factor of competition between local government units. The municipalities are responsible for the availability of local public services (including municipal services). In this respect, their operation is subject to social evaluation, and the level of satisfaction of residents from the local public services offer can serve as an indicator of the assessment of their performance.

Respondents rated educational services the best, whereas telecommunications services and water supply slightly lower. The worst assessments were recorded for sewage disposal services, which is related to the insufficient level of sewage system development. The highest rating of the offer of local public services was assessed by city residents, the assessment of the inhabitants of rural municipalities was clearly lower, while the lowest was found by people living in urban-rural municipalities.

Knowing the importance of public services, local authorities are taking efforts to make their offer more tailored to the preferences of the residents. For this

purpose, they undertake investment activities aimed at expanding and modernizing the infrastructure that enables their provision. Due to high investment costs, they obtain external financial resources, including EU funds. Municipal authorities should strive to develop, in particular, those public services that have been rated the lowest. This is related to the necessity of spending budgetary resources on the development of adequate infrastructure.

The conducted analysis showed the existence of positive dependencies between the scope of investment activities carried out and the level of satisfaction of the residents with a given public service. Such a relationship occurred mainly in relation to relatively lower rated services. In the case of the better assessed services (e.g. educational, cultural), the relationship between these variables was clearly weaker.

When carrying out assigned tasks, the authorities of municipalities should take every effort to improve the quality of local public services. The assessment of their social efficiency will then be higher. The better assessment of public services is not only an expression of an improvement in the standard of living. It can also be an argument deciding on the location of new business entities, which in turn may lead to the acceleration of local development.

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VALUE-ADDED, NET INCOME AND EMPLOYMENT IN FARMS IN SLOVAKIA

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Abstract

The paper analyses the changes in productivity of farms in Slovakia over the period 2009-2015. Due to the structure of farms and dominance of large agricultural holdings in Slovakia, the production is based on commodities with low value added. Large farms often substitute labor with capital. Employment in Slovak agriculture has decreased significantly since 2004. We use the FADN methodology for Farm Income, employment and value added to compare the situation in EU member states with Slovakia. Out of V4 countries is the decrease in employment the highest in Slovakia, followed by Czech Republic, Poland and the smallest decrease in employment was recorded in Hungary. Labor input is one of the three main production factors followed by Land and Capital. Decrease in labor force input by the same level of production results in higher productivity. The value added is important as it creates value for society, has positive effect on job creation and business performance. The majority of utilized agricultural area UAA in Slovakia (75%) is cultivated by large farms – agricultural holdings – with 1200 ha per farm on average. Therefore, although subsidies in form of direct payments per hectare are lower than in old EU member states, the payment per farm is one of the biggest in EU. This negatively affects the motivation of farms in Slovakia to create value added and farms focus on production of commodities well suited for large farming. While the structure of farms in Slovakia differs from the EU-28, also the measures implemented through CAP result different in Slovakia. Farmers are not motivated to produce while the intensity of support is increasing.

Keyword: *Farm Income, Employment, Productivity of Farms*

JEL classification: *Q12, Q14*

1   Introduction

World agriculture development objectives should take into account the irreplaceable function of agriculture in economic and social fields, pre-production facilities, environmental security of the population, development and protection of the landscape, ecological functions, stability of rural development and others.

Public support for agriculture should be based on objective valuation of social benefits of agriculture for society (public goods). In the opinion of several experts, to evaluate the cross-sector position of agriculture only by share of GDP, by share on employment and by share on foreign trade is not representative.

In EU agriculture the added value is considered as an indicator of its production performance. Net income from business activities in agriculture reflects the synergy effect of the reproduction process of production activities in agriculture. (Serenčéš, P. – Čierna, Z. – Piterková, A., 2016).

According to Serenčéš, P. – Tóth, M. (2012), in a functioning market environment, there is no potential for agricultural development created by entrepreneurs who produce everything and for any price, but they respect the theory of realizable agricultural production on the market, environmental and ecological production requirements and balanced internal consumption.

There has always been significant political tradition towards small farm protection and support in Europe (Mayfield, L. H., 1996). Many arguments have been used to support this attitude covering aspects like social importance and environmental benefits. His study concludes, that small farms seems to be more connected to local rural economy than large farms and therefore small farms do more support rural areas mainly in indirect employment. Therefore, small farms deserve more attention and support focused on rural development.

Role of agriculture in economic development and rural policy support for small farmers in comparison with large agriculture are in centre of long and controversial discussion. Small agriculture has similar potential to stimulate agricultural production growth as large farming. Short supply chains cover mainly informal sectors and generate more jobs than holding agriculture. Focus of agricultural and land policy on small food producers and a complex integrated rural development policy is therefore needed not only due to social equality, but also due to economic development support (Mellor, J. W. – Malik, S. J., 2017).

Serenčéš, P. – Čierna, Z. – Piterková, A. (2016) analysed by ratio analysis situation and development of agricultural production in Slovakia. In the observed period 2009-2013 using FADN data they focused on farm net income and farm area. In comparison to other EU countries the average farm size is significantly higher. In 2013 the average area of land per farm in the Czech Republic is 232,93 ha, in

Germany 86,63 ha, in France 85,87 ha, in Hungary 45,02 ha, in Netherlands 34,61 ha, in Austria 32,39 ha, in Poland 19,11 ha and in Slovak Republic 594,82 ha.

2 Data and methodology

Slovakia's accession to the European Union meant for Slovak Agriculture duty to evaluate the performance by common methodology of the EU.

The **F**arm **A**ccountancy **D**ata **N**etwork (FADN) is an instrument for evaluating the income of agricultural holdings and the impacts of the Common Agricultural Policy launched in 1965. It consists of an annual survey carried out by the Member States of the European Union. Derived from national surveys, the FADN is the only source of microeconomic data that is harmonised, i.e. the bookkeeping principles are the same in all countries. The survey does not cover all the agricultural holdings in the Union but only those which due to their size could be considered commercial. (http://ec.europa.eu/agriculture/rica/database/ database_en.cfm (2016-02-26)).

Article evaluates the development of the selected indicators they evaluate the Slovak agriculture performance for the last 7 years (2009-2015) according to the methodology of the FADN. Then on the last available data, in 2015, the position of Slovak agriculture is compared with the average for the EU-28 and the selected EU Member States such as Czech Republic, Germany, France, Hungary, Netherlands, Austria and Poland.

Table 1 shows the number of farms in a representative sample for the Slovak Republic in the examined period 2009-2015, the average number of farms for the period and average acreage per farm for examined period. There were evaluated results in average for 3 990 farms in examined period in Slovak Republic. The average size of farms in Slovakia in examined 7-year period is 524,81 hectares.

Table 1 **Farm represented and Total Utilised Agricultural Area (ha) (Slovakia, years 2009-2015)**

	Farms represented	Total Utilised Agricultural Area (ha)
2009	4 160	525,72
2010	4 290	508,77
2011	3 900	552,91
2012	4 580	474,75
2013	3 710	550,87
2014	3 640	532,04
2015	3 650	528,59

	Farms represented	Total Utilised Agricultural Area (ha)
Average	3 990	524,81

Source: FADN database, own calculations.

The article compares the state and development of the following indicators: total output, current subsidies and subsidies on investments, gross farm income, farm net value added, farm net income and development of employment in agriculture. Assessment of labor (AWU) in Slovakia and selected EU countries for the years 2005-2016 is based on Eurostat data. We compare the labor input with the production in individual EU countries.

Chart 1 **Creation of Gross Farm Income, Farm Net Value Added and Farm Net income**
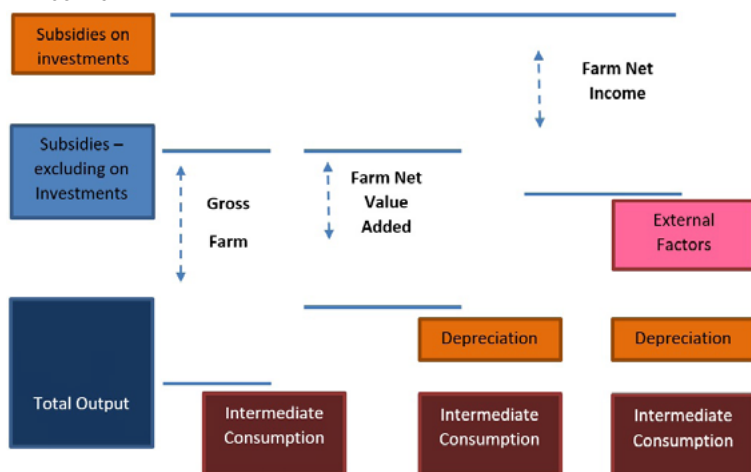
Source: Authors.

Chart 1 shows creation of the gross farm income, of the farm net value added and farm net income.

3   Results and Discussion

Slovakia has the third highest UAA per farm in EU and agriculture is dominated by large farms with 71,6% share on total land (UAA). Large farm use hired labour. During the communist era farms in Slovakia were large cooperatives and state owned farms with large acreage, without existence of private companies. 29 years

after the change of the economy from centrally planned to market economy the structure of farms is still different compared to agriculture in old EU member states. The majority of UAA is cultivated by large farms – agricultural holdings – with 1 200 ha per farm on average. Therefore, although subsidies in form of direct payments per hectare are lower than in old EU member states, the payment per farm is one of the biggest in EU. (Table 2).

Table 2 **Structure of farms according to the size of land (UAA) (Slovakia in 2016)**

Size of land (ha)	0-5	5-10	10-50	50-100	100-250	250-500	Over 500	Total
Number of farms	8 037	3 367	4 262	925	868	528	997	18 984
Market share (%)	42,3	17,7	22,5	4,9	4,6	2,8	5,3	
Land share (%)	1,1	1,3	4,9	3,5	7,4	10,2	71,6	(ha) 1 871 948

Source: Agricultural Paying Agency, own calculations.

Before analysing the situation and development of the total output, intermediate consumption and farm net value added, used indicators were calculated per hectare for the years 2009-2015 in Slovakia and in each of the selected EU countries in 2015 (Table 3).

Table 3 **Total Output, Intermediate Consumption and Farm Net Value Added per hectare (Selected EU countries in 2015)**

	Total Output	Intermediate Consumption	Farm Net Value Added
Czech Republic	1 486,06	1 150,00	548,04
Germany	2 694,84	1 831,20	912,08
France	2 309,06	1 463,06	783,41
Hungary	1 506,56	1 078,23	598,00
Netherlands	13 248,75	8 289,36	3 879,49
Austria	2 661,07	979,63	536,94
Poland	1 527,52	979,63	536,94
Slovakia	1 120,29	853,90	362,29

Source: FADN database, own calculations.

The low level of total production and net added value in Slovakia compared with selected EU countries mainly consists in the fact that the majority of agricultural holdings perform primary agricultural production without production of products of higher added value, i.e. without processing and finalizing production.

Entrepreneurial activity in agriculture has its own specificities and particularities that manifest in the verticality of production and consumption as disparities: science and technical progress, competition and profit, which are the engine of development in the market economy, they have other objective conditions in the food production verticality, as they are in other manufacturing sectors.

Agriculture has produced essentially the same products in the history of mankind. There is a lack of a new discovery as a revolutionary means of development and profit generation in agriculture. Science and technical progress in agriculture have increased land productivity, animal productivity, labor productivity has increased with a reduction in staff and profits. If there is a different course of technical development, different dynamics of the profit creation in agriculture, the competition must have also different course.

The real consumption of food is determined by the purchasing power of the population, which can push food consumption below the physiological limit, but not above this limit.

The purchasing power of the population as well as the consumption of food are not dynamically growing indicators, that is, even the mass of profits formed in the food production vertically is virtually constant: competition and profit struggle are promoted between the different components of the food verticals.

As a result of the competition, due to the objectively higher costs in the Slovak agriculture and the increase of the negative balance of foreign trade in food and agricultural products, the still decreasing formation of the mass of profit in agriculture.

In these disparities, untapped employment potential in Slovakia is hidden. In further analytical work we will focus on the assessment of individual indicators at the farm (agricultural enterprise) in Slovakia and in selected EU countries.

3.1   Development of the total production and subsidies

Total agricultural output represents the sum of the values of crop and animal production, services for agricultural primary production and inseparable non-agricultural secondary activities.

Chart 2 **Total Output and Subsidies per Farm in € (Slovakia, years 2009-2015)**
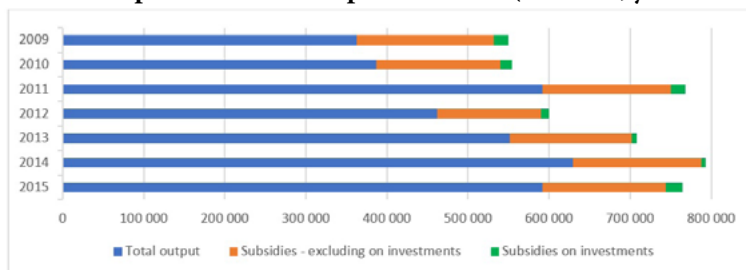
Source: FADN database, authors.

Total production in the Slovak agriculture has increased in 2015 compared to 2009 by 62%. Subsidies-excluding on investments for the period fell from 2009 to 2012 and then again increased. In 2015 compared to 2009, the decrease was 9,00%.

Subsidies on investments in agriculture recorded during the reporting period 2009-2015 increase and in 2015 subsidies on investments reached the highest level on farm 19 942 eur (index 2015/2009 is 1,13).

There are not only changes in trends of growth resp. of decrease in total agricultural production, in subsidies-excluding on investments, in subsidies on investments during the years 2009-2015 in the Slovak agriculture, but also in the structure and weight of the individual components of the performance of agriculture.

Chart 3 **Total Output and Subsidies per Farm in € (Selected EU countries in 2015)**
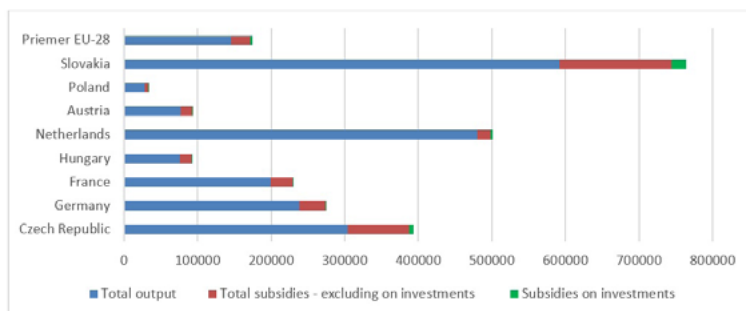
Source: FADN database, authors.

Chart 4 **Total Output and Subsidies per Farm in % (Selected EU countries in 2015)**
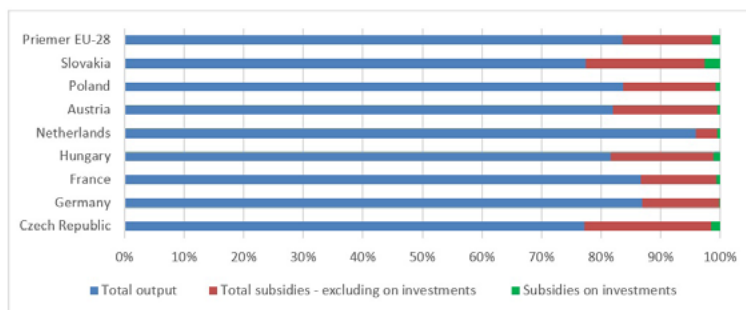
Source: FADN database, authors.

The share of the subsidies-excluding on investments and subsidies on investments in Slovak agriculture on total agricultural production recorded since 2009 an annual decrease (in 2013 a slight increase). While the article is not focused on analysing the relationship between subsidies and growth resp. decrease of the total agricultural production, because it requires a comprehensive approach, despite of it we can add the significant decrease in relation to mentioned components by 45% to significant growth of the total agricultural production and to stagnation of the subsidies over the analysed period 2009-2015 in Slovak agriculture.

The lowest share in the Netherlands (3,77%) and the highest in the Czech Republic (27,62%) and in the Slovak Republic (25,64%) is the result of the comparison of the share of current subsidies on total agricultural production in selected EU countries for year 2015. Germany has a share of 14,62%, France 14,64%, Hungary 21,20%, Austria 21,40%, Poland 18,40% and EU-28 average 18,04%.

3.2 Development of the Gross Farm Income, Farm Net Value Added and Net Farm Income

According to Varoščák, J. – Grznár, P. (2010) net income from agribusiness is a synergistic effect of the reproduction process of agriculture, i.e. of agricultural production activities, of employment in agriculture, of agricultural policy of the state and EU, of the agricultural land revenues and of the financial capital.

Chart 5 **Gross Farm Income, Farm Net Value Added and Farm Net Income in €**
(Slovakia, years 2009-2015)
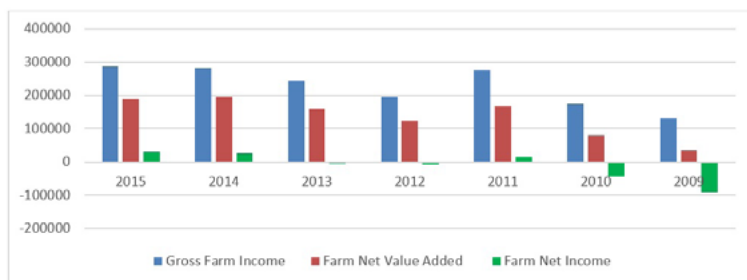
Source: FADN database, authors.

Chart 6 **Gross Farm Income, Farm Net Value Added and Farm Net Income in €**
(Selected EU countries in 2015)
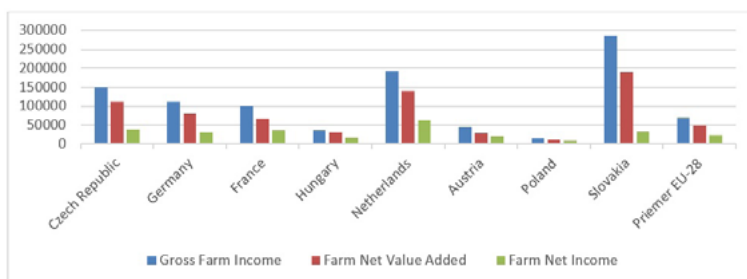
Source: FADN database, authors.

The value added is a part of the production value created by the producers activities. A special feature of the value added of agriculture is that the resulting value is reduced by taxes on products and increased by subsidies on products, listed Varoščák, J. - Grznár, P. (2010).

According to Serenčéš, P. – Tóth, M. (2012) the key problem of low efficiency of Slovak agriculture is a low level of value added which is compensated by public resources in the form of subsidies. Low level of value added results in the high share of depreciation on gross value added as well as the high proportion of labor costs on net value added. Therefore the profit for the owner of agricultural production is very low.

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3.3 Development of employment in agriculture

Since 2005 in Slovak agriculture employment did decrease the most out of all EU countries. One of the main reason for this is the farm size in combination with EU Common Agricultural Policy. Farms receive subsidies which are mainly linked to UAA of the farm. Higher UAA means higher subsidies in total. There is no motivation to increase the production because of decoupling applied in CAP. Large farms in Slovakia tend to decrease the cost by decreasing Labour input. In comparison to countries with small farms the decrease in employment is much higher in Slovakia. Small farms cannot rely on subsidies only but they need also real agricultural production. Large farm on other hand with (1 200 hectares is the average size of large farms in Slovakia) receive only in form of subsidies a significant amount of money (in Slovakia 282€/ha on average) and tend to replace labour by technology much more than small farms.

Table 4 **Agricultural working units in selected MS in comparison with 2005 (in %, 2005 = 100%)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EU-28	93	91	88	81	79	78	78	76	75	74
Czech Republic	91	87	82	78	76	76	76	75	75	75
Germany	95	93	91	90	89	88	86	87	85	85
Hungary	88	82	85	85	84	83	85	89	85	84
Austria	93	91	90	87	86	86	85	83	82	81
Poland	100	100	97	84	84	84	85	85	85	85
Slovakia	92	91	87	57	58	58	55	55	49	48

Source: Eurostat, own calculations.

In countries with small farms there are much more CAP beneficiaries mostly in rural areas than in countries with large farms. Rural development and rural economy suffers more in Slovakia than in countries with small farms.

Current labour input per 100 ha in Slovakia is comparable to Germany, France, Luxembourg, Denmark, but Standard Output is the lowest even compared to V4 countries. This is mainly due to the size of the farm measured by UAA and ownership structure, which is based on private companies with a limited number of owners.

Chart 7 **Employment and production in EU MS (year 2013)**
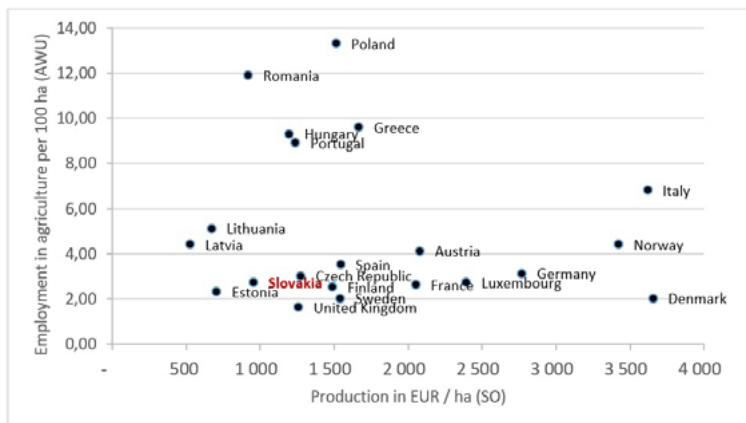
Source: Eurostat, own calculations.

Large farms in Slovakia behave rationally and try to benefit from the current CAP. In the production, they focus more on crops than on animal production which is much more labour intensive. In crop production, the large farms focus on products with low value added and crops, where intensive large farm technology can be used. Therefore, Slovakia crop production is focused on basic commodities and products with low value added. Large farms benefit from economy of scale. Standard Output per ha (excluding direct payments) in Slovakia is comparable with Romania, Bulgaria, Ireland and is lower than in other V4 countries.

4   Conclusion

The global economic and environmental crisis raises the demand for changes in the agriculture and food industry, not only in Europe. In general, factors that would support the vision of a world without hunger, malnutrition and poverty can be summarized as follows: to invest in agriculture, to encourage educated people, to support science and research, to promote the development of small and medium enterprises, to implement sustainable food systems that respect the environment and human health, to limit the generation of food waste, to promote healthy nutrition and social protection. (Serenčéš, P. – Čierna, Z. – Piterková, A., 2016).

From the analysis of some selected indicators and their comparison of the Slovak agriculture and selected EU countries can assess the status and development (on the farm or per hectare of land) as follows:

- The average area of agricultural land on the farm in Slovakia is the highest within the EU countries.
- The intensity of the inputs and outputs (the total agricultural output, intermediate consumption per hectare of the land) is in Slovakia the lowest within the EU countries.
- Slovak agriculture in the indicator Farm Net Income is in negative value, as the only EU Member State in years 2009-2013. In years 2014 and 2015, Slovakia achieved in the indicator Farm Net Income positive values.

Main reason for the low employment and low value added in Slovak agriculture is the high average size of the farm which is the result of the communist era. Large farms use hired labour which is different to small family farms. Farms in Slovakia focus on crop production and replace labour with technology.

We conclude that support in form of subsidies should by focused on small farms which would result into higher employment. Rural economy would benefit in form of higher or constant employment, local food consumption and development of other sectors in rural areas. Large farms should benefit from the economy of scale and should be competitive also with lower support in form of public funds. Capping direct payments should be introduced in Slovakia.

In order to solve the problems of agriculture we propose the following:

- To pre-define the relationship between the public sector, local government, private and business sector.
- Eliminating the gap between scientific knowledge and political decisions a reality, in practice to implement the right to choose, create alternatives outside of super and hypermarkets and multinational companies (regional companies).
- Develop a system for evaluating cross-sector of agriculture.
- Develop a methodology for the valuation of non-production benefits (income) of agricultural land use.
- Public support for agriculture and the justification should be based on an objective assessment of social benefits to society of agriculture (public goods). (Serenčéš, P. – Čierna, Z. – Piterková, A., 2016).

Acknowledgement

by the project VEGA no. 1/0338/18 with the title "*Impact of the Common Agricultural Policy on the mitigation of income risk in Slovak agriculture and factors determining the level of risk of agricultural companies*".

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WEATHER INDICES IN THE PROFITABILITY CALCULATIONS OF SELECTED CROPS AT THE SECTORAL LEVEL ON THE EXAMPLE OF FODDER MAIZE

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Abstract

The objective of this paper is to use weather indices to estimate the cost of production risk in the profitability calculations of selected crops on the example of fodder maize. The source of data are GUS secondary data (concerning, among others, yields) and System of Collection of Data on Agricultural Products - Agrocosts (Agrokoszty) in the Agricultural Accountancy Department of IAFE-NRI. The indicator analysis method was used, taking into account measures and indicators used in the economics of agriculture. The methodical approach to estimating the cost of production risk that is proposed by authors is based on the use of so-called weather indexes (WI). Methodology for estimating the cost of production risk for fodder crops is based on the category of yield lost due to unfavourable weather conditions, as the difference between yields potentially achievable in optimal weather conditions and real yield. The cost of production risk corresponds to the monetary effects of the materialization of unfavourable weather phenomena. The weather index as a synthetic measure can take positive values. Green maize is the alternative (competitive feed) for clover and alfalfa forage. Taking into account the cost of risk in total production costs reduced the profitability index (including the cost of risk) of fodder maize only in 2014-2015. The production of fodder maize was profitable in 2009-2013, which resulted from the favourable price of fodder barley on the market. In the calculation of costs, the cost of risk cannot be omitted because its omission leads to underestimation of

economic and financial results, which in turn may lead to incorrect decisions at the micro level regarding, for example, agricultural crop portfolio, investment activities, and macro level too high support in the form of payments area (mainly, decoupled payment as remuneration for lost income.

Keywords: *production risk, , profitability calculations, risk management, subsidies, weather index.*

JEL classification: *Q18, Q14.*

1 Introduction

Agriculture is treated as a specific branch of the national economy, which results from its strong dependence on factors beyond farmers's control. In particular, crop production is exposed to difficult to predict changes in natural factors affecting agricultural output (Lidsky et al., 2017, Majewski et al., 2008). In addition, Harwood et al. (1999) indicate that for the majority of field crops, price volatility is the main risk factor, followed by yield variability, while other risk categories that are associated with total yield loss are of marginal importance. This means that the production risk seems to be one of the main problems in crop production.

The above situation is conducive to the emergence of difficulties in predicting production volume, income, costs and losses (Jerzak, 2008). Sokołowska (2008) stated that about 80% of the variability of agricultural production is conditioned by weather factors, which significantly affects the financial results of agricultural holdings. It is also noticed by El Benni and Finger (2012), who prove that costs play a small role in determining income volatility, but the risk of prices and profits is of great importance and is specific to particular crops. Hence, profitability calculations are important for making the right economic decisions that result in minimizing the negative financial consequences for farm households. The group of risks with a particular intensity in agriculture include production risk, which is closely related to climatic and weather changes. The biggest threats to crop production are caused by strong changes in temperatures and rainfall. It is therefore important to take over the risk costs in the profitability calculations for individual crops. This also allows to assess the need for subsidizing a given crop.

The objective of this paper study is to use weather indices to estimate the cost of production risk in the profitability calculations of selected crops on the example of fodder maize (*Zea mays L.*).

The remainder of this article is following. After a brief justification for tackling of the research problem, we provide a literature review that focuses on a plethora of implications of weather risk from the perspective of crop production and

agricultural policies. Then, we present data and methodology, depicting our approach to implementing of weather indices. Our results, including calculations for green fodder maize, are discussed. We conclude with some research and political recommendations.

Literature review

In the existing literature, weather risk is usually divided into two types and several categories. As for the types, these are: extreme events (varying from short-lived, violent phenomena of limited extent to the effects of large systems; the most common examples being tornadoes, thunderstorms, cyclones or floods) and regional climate anomalies (mesoscale storms, severe local storms, hail, etc.). The commonly used categories of weather risk, on the other hand, are as follows: (i) droughts, (ii) heavy rainfall and floods, (iii) strong winds (tornadoes, storms and tropical cyclones), (iv) temperature (frost and heatwaves), and (v) others (duststorms and sandstorms, hailstones, fog, smoke, haze and pollution, locust) (WMO, 2010). It is worth noting that in recent decades the scale of the occurrence of both types and most of the above categories has steadily progressed due to climate change and that it is likely to increase even further in the future. For instance, a report by Global Food Security ([GFS], 2015) suggests that the risk of a 1-in-100 year production shock in agriculture is likely to increase by 2040 to 1-in-30 or more. The existence of numerous and diverse weather risks implies appropriate strategies to both prevent their occurrence and, once they occur, to reduce and eliminate their effects. According to World Development Report 2000/2001 (World Bank, 2001, p. 140), risk management strategies in agriculture can be divided, in general, into two basic categories: informal strategies (identified as "arrangements that involve individuals or households or such groups as communities or villages") and formal strategies ("market-based activities and publicly provided mechanisms"). In the case of the former, as indicated by the authors of Managing Risk in Agriculture: a Holistic Approach (Organisation for Economic Co-operation and Development [OECD], 2009), farmers have essentially three options for dealing with weather risks: „prevention strategies to reduce the probability of an adverse event occurring, mitigation strategies to reduce the potential impact of an adverse event, and coping strategies to relieve the impact of the risky event once it has occurred" (p. 21). In the case of formal strategies, on the other hand, the policymakers either put emphasis on training farmers, compensate them for catastrophes, or rely on (subsidized) insurance mechanisms (Lorant & Farkas, 2015).

In addition to intrinsic sources of uncertainties in agricultural production (market price volatility, animal and plant health-related risks, etc.), the impact

of weather-related risks[1] on this sector, especially in the context of the advancing climate change, has become more and more important concern for both farmers and policymakers worldwide. Addressing the problem of weather risk we should, however, begin with the discussion of the term itself. The essential—from the point of view of agriculture—distinction between weather and climate requires clarification in the first place. World Meteorological Organization in its Guide to Agricultural Meteorological Practices (World Meteorological Organization [WMO], 2010) explains that "The term weather is used to describe day-to-day variations in our atmosphere.... Weather is therefore an instantaneous concept. The climate of a region is described by collating the weather statistics to obtain estimates of the daily, monthly and annual means, medians and variability of the weather data. Climate is therefore a long-term average of weather" (p. 7-1). Weather risk, as we understand it in the context of agricultural production, applies to both weather and climate.

Among numerous weather risk insurance solutions, a weather index-based insurance (WII) is of particular importance[2]. This product was created in response to numerous problems with traditional weather risk insurance (and with traditional insurance in general), primarily related to asymmetric information and high transaction costs (Conradt et al., 2015). Index-based insurance product offers some potential in this regard by conditioning the payout not on actual losses experienced by policyholders, but on the realization of an independent index, making use of variables exogenous to the insured individual but with a strong correlation to farm-level losses (BuChun et al., 2010; Hess, 2007). The fact that weather index-based insurance product does not—as it is the case with conventional insurance—require loss assessment therefore reduces transaction costs, while the use of an objective indicator (unlike conventional insurance which is

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[1] The use of the term 'risk' in the context of weather hazards—the distinction between risk, hazard and anomaly in particular—also requires some explanation. By hazard we understand a potentially destructive event or process, risk corresponds to the magnitude of a potential loss within the area subject to hazard for a particular location and a reference period, while anomaly is the deviation of a meteorological quantity value from the normal (mean) value for a given period (WMO, 2010).

[2] As Spicka and Hnilica (2013) explain, "a weather index that is the collection of weather variables measured at a stated location during an explicit period" (p. 1). Hess (2007) points out that the measurement risk for the index must be low which means that the indicator is required to be believable, reliable, and void of human manipulation (the conditions that are usually met by publicly available measures of weather). He also emphasizes the role of new technology innovations (e.g. automated instrument calibration) in the increase of index credibility. Moreover, he draws attention to the special requirements for indices that are to serve as the basis for weather insurance: they must be, above all, strongly correlated with yield or revenue outcomes for farms across a large geographic area.

based on yield loss, where the insurer is often unable to determine to what extent the loss is due to a weather- or climate-related event and to what—due to farmer's lack of work) prevents information asymmetries (Ricome et al., 2017).

The main problem with the use of the index, however, is the so-called basis risk: the difference between farmer's loss and the payout it triggers. This can manifest itself in a situation where a policyholder experiences yield loss, but does not receive a payout, or—alternatively—in a payout without any actual loss. Weather index-based insurance therefore works best where losses are homogeneous (both time- and area-wise) and highly correlated with the indexed risk (International Fund for Agricultural Development, 2011; Fuchs & Wolff, 2011). A key challenge to achieve the potential benefits from WII is thus to improve the design of both insurance and the index itself (Conradt et al., 2015).

In recent decades the use of weather index-based insurance in agriculture has been the subject of numerous studies, empirical ones in particular. In their analyses, most of the authors deal with a simple index based either on rainfall or temperature (e.g. Turvey, 2001; Martin et al., 2001; Barnett & Mahul, 2007; Berg & Schmitz, 2008; Kellner & Musshoff, 2011; Daron & Stainforth, 2014). An alternative approach, trying to address the problem of indices' oversimplification can be found, for example, in Conradt et al. (2015).

Sivakumar and Motha (2007) point out that risk management strategies in agriculture can involve such basic categories of activities as: (i) avoiding the dangers, (ii) preventing/reducing the frequency impacts, (iii) controlling/reducing the consequences, (iv) transferring the risk, (v) responding appropriately to incidents/accidents, and (vi) recovering or rehabilitating as soon as possible. The same authors draw attention to a specific aspect of weather risk management in agriculture, related to its time perspective: "The climate-based decisions that farmers make are mainly strategic in nature, e.g. choice of a crop/cropping system, allocation of acreage, purchase of inputs such as seed and fertilizer ahead of the cropping season, etc. In contrast, the weather-based decisions are tactical in nature and affect the operational activities such as sowing, fertilizer application, irrigation, weeding, harvesting, etc. Farm-level risk management strategies have to deal with both the changing and variable climatic conditions as well as the weather conditions" (p. 477). Since some of the management strategies in the case of weather risk in agriculture are not available at all (e.g. avoiding the dangers, preventing the frequency impacts, etc.), while others can be applied only to a limited extent and under certain conditions, the most popular strategies include transferring the risk, in particular through weather risk insurance. This, moreover, remains in line with the global trend—an increasing reliance on insurance in agricultural risk management in general. For instance, Lorant and Farkas (2015)

notice that, according to estimates, agricultural insurance premiums worldwide amounted to as much as USD 23.5 billion in 2011, while other studies (e.g. Wang et al., 2011) show that this trend applies not only to developed countries (and state organizations, such as the EU with its Common Agricultural Policy) but to developing ones as well.

Finally, the possible impact of government policies on the weather risk insurance sector cannot be left unnoticed. This applies in particular to insurance subsidies. Governments frequently subsidize agricultural insurance in order to increase the demand for it by lowering the premiums charged to farmers. The subsidies may take different forms, e.g. direct premium subsidies, administrative or product development costs reimbursements, or below-market premium rates reinsurances (Hess, 2007). It is noteworthy, however, that not only farmers but also private insurance companies may be beneficiaries of government subsidies, since the latter often provide coverage for farmers against different weather- and climate-related risks with public support. Lorant and Farkas (2015) observe that farm insurance (including weather risk-related) is particularly intensively subsidized in numerous developed countries, the two most notable examples being the United States and the EU.

Strategic risk management starts with decisions made at the farm-level, where various types of risk management strategies and instruments are selected and implemented. Nevertheless, Wolf et al. (2009), however, note that the impact of risk management instruments on risk mitigation depends, inter alia, on from the scope of risk resulting from yields and prices, hence production costs may vary and affect farmers' income. This is confirmed by the studies of El Beni and Finger (2012), who indicate that both prices and yields contribute on average from 88% (barley) to 98% (sugar beet) to the volatility of net income. It seems reasonable, therefore, to take into account the costs of production risk reflecting the variability of yields and prices in profitability calculations.

To conclude, the approach based on weather indices can be applied for assessment of profitability of selected crops. This is of great importance for decisions on to construct criteria of eligibility for I Pillar payments (within Common Agricultural Policy, CAP).

2 Data and Methods

The sources of secondary data (concerning, among others, yields) included GUS (Główny Urząd Statystyczny, Central Statistic Office) and System of Collection of Data on Agricultural Products - Agrocosts (Agrokoszty) in the Agricultural Accountancy Department of IAFE-NRI. The indicator analysis method was used,

taking into account measures and indicators used in agricultural economics. The algorithm of calculation for margin categories can be described as follow (Skarżyńska, Jabłoński 2016, p. 167):

Total output
- Direct costs
= Gross margin without subsidies
- Actual indirect costs (excl. the cost of external factors)
= Gross value added from an agricultural activity
- Indirect estimated costs minus depreciation
= Net value added from an agricultural activity
- The cost of external factors
= Income from activity without subsidies
+ Additional payments
= Income from an agricultural output

When calculating the production risk for fodder plants, including alfalfa, clover and maize, the problem is the lack of so-called active market, hence the most-favoured variable for the production of non-commodities. The methodical approach to estimating the cost of production risk is based on the use of so-called weather indexes, IP. These indexes are designated only for selected crops, and in the absence of an indexed index, plants with the most similar physiological traits are usually taken over (Kopiński et al., 2013).

A methodological approach for estimating the cost of production risk for fodder is based on use the category of yield lost due to outstanding (unfavourable) weather conditions, as the difference between yields potentially achievable in optimal weather conditions and real yield (Kopiński et al., 2013, pp. 53-63). The cost of production risk corresponds to the monetary effects of the materialization of unfavourable weather phenomena.

It should be underlined that the weather index (WI) as a synthetic measure based on a set of agro-metheorological parameters - can take only positive and total values:

WI = 100 - average weather conditions determined in the area,
WI <100 - unfavorable conditions (materialization of weather risk),
WI > 100 - above-average conditions.

The amount of yields potentially achievable is determined in accordance with equation (1):

$$y_i=(x/WI)\cdot 100 \qquad (1)$$

y_1 – potential yield that is achievable in optimal weather conditions [dt/ha];

      x – real index [dt/ha];

      WI – weather index (derived from the Institute of Soil Science and Plant Cultivation - State Research Institute, ISSPC-SRI, IUNG-PIB).

Yield that was potentially lost due to extraordinary weather conditions (v) was determined as the difference between the potential yield (y_1) and real yield (*x*), as below (2):

    Due to the use of averaged values (at the country level), there were no grounds to increase the yield for above-average benefits.

    The cost of production risk (c_{pr}) - as a monetary value - is the product of the equivalent of fodder barley (constant - 0.144), its market price and lost yield (if exist), according to equation (3).

$$c_{pr} = 0{,}144 \cdot p \cdot v \tag{3}$$

where: 0,144 - fodder barley equivalent (1dt of green equals to the content of nutrients 0.14 dt of feed barley);

        p - price of feed barley [PLN/dt].

3   Results and Discussion

Table 1 presents calculations of profitability for green fodder maize (timespan: 2009-2015), whereas table 2 contains calculations costs of production risk. Yields of fodder maize were relatively stable (excluding the last year of timespan). Only in 2014 and 2015 potential maize yield was lower than real yields. Consequently, lost yields and cost of production risk were calculated. Taking into account the cost of risk in total production costs reduced the profitability index (including the cost of risk) of fodder maize only in 2014-2015. The production of fodder maize was profitable in 2009-2013, which resulted from the favourable price of fodder barley on the market.

Table 1 **Calculations of profitability for green fodder maize**

Description	2009	2010	2011	2012	2013	2014	2015
Yield of fodder maize [dt/ha]	449	437	496	499	486	478	357
Yield as an equivalent of fodder barley [dt/ha]	64,7	62,9	71,4	71,9	70	68,8	51,4
Purchase price of fodder barley (GUS) [dt/ha]	38,4	46	71,5	78,6	72,7	60	57
Total output (TO) [PLN/ha]	2484	2892	5106	5647	5090	4131	2930
Total direct costs [PLN/ha]	1262	1061	1419	1528	1543	1497	1492

Description	2009	2010	2011	2012	2013	2014	2015
Gross margin without subsidies [PLN/ha]	1222	1831	3687	4119	3547	2633	1438
Total indirect costs [PLN/ha]	1032	868	1161	1251	1263	1225	1221
Income from activity without subsidies [PLN/ha]	190	963	2526	2868	2284	1408	218
Total costs [PLN/ha]	2294	1929	2580	2779	2806	2722	2713
Costs of production risk, CPR [PLN/ha]	0	0	0	0	0	128	643
Total costs + CPR [PLN/ha]	2294	1929	2580	2779	2806	2850	3356
Income from activity without subsidies excl. CRP [PLN/ha]	190	963	2526	2868	2284	1280	-425
Profitability indicator (Total Output/Total Costs) [%]	108,3	149,9	197,9	203,2	181,4	151,8	108,0
Profitability indicator incl. CPR (Total Output/Total Costs) [%]	108,3	149,9	197,9	203,2	181,4	144,9	87,3

Source: Own computation based on GUS, Agrokoszty (team of A. Skarżyńska) and IUNG-PIB data.

Table 2 **Calculation of costs of production risk**

	2009	2010	2011	2012	2013	2014	2015
Yield of maize for green fodder (GUS) [dt/ha]	449,0	437,0	496,0	499,0	486,0	478,0	357,0
Yield in feed barley equivalent [dt/ha]	64,7	62,9	71,4	71,9	70,0	68,8	51,4
Purchase prise for barley yield (GUS)	38,4	46,0	71,5	78,6	72,7	60,0	57,0
Weather index for grain corn (IUNG-PIB) [-]	104,0	101,0	113,0	106,0	100,0	97,0	82,0
Total output (TO) [dt/ha]	2484	2892	5106	5647	5090	4131	2930
Real crop yield [dt/ha]	449,00	437,00	496,00	499,00	486,00	478,00	357,00
Potential crop yield [dt/ha]	431,73	432,67	438,94	470,75	486,00	492,78	435,37
Lost yield [dt/ha]	0,00	0,00	0,00	0,00	0,00	14,78	78,37
Total output for lost crop [dt/ha]	0,00	0,00	0,00	0,00	0,00	127,75	643,23

	2009	2010	2011	2012	2013	2014	2015
Cost of production risk [dt/ha]	0,00	0,00	0,00	0,00	0,00	127,75	643,23

Source: Own computation based on GUS, Agrokoszty (team of A. Skarżyńska) and IUNG-PIB data.

Green fodder maize is the alternative (competitive feed) for clover and alfalfa forage. In terms of soil and fertilizers, fodder maize belongs to fastidious crops, strongly exposed to high production risk, especially high sensitivity to changing weather conditions (e.g. the so-called drought stress and low tolerance to spring chill, hail or rainfall) and high susceptibility to diseases. Including production risk in the profitability calculations for fodder maize seems to be strongly justified. This is indicated by Zaliwski and Hołaj (2005), who emphasized that a correct economic calculation must take into account production capabilities (e.g. environmental conditions, prices) and production restrictions (cost of technologies used, risk, required quality level, etc.). Cost-effectiveness calculations that take into account the production risk can be used to seek better solutions to the decision-making situation. This allows a more accurate assessment of the economic effects of fodder maize.

Research including the cost of risk minimization in profitability calculations was carried out, among others, by General Manitoba Agriculture, Food and Rural Development ([MAFRD], 2016) and Skarżyńska et al. (2017). They point out that the inclusion of the cost of risk in the profitability calculations of fodder crops can significantly affect the production decisions of economic entities. This is especially important in the case of maize for green fodder because of its growing economic importance, both in Poland and in the world. Research conducted by Lipski (2004) indicates that the area of maize cultivation in Poland—as well as the yield of grain and green fodder —has been growing constantly since 1996. This is undoubtedly the reaction of producers to the increasing market demand caused by the concentration of animal production. These results are confirmed by Skarżyńska et al. (2017), who indicate that in 2003-2015 the area of maize for green fodder cultivation in Poland increased significantly from around 240,000 ha to over 555,000 ha and it was several times larger than the acreage of clover and alfalfa. This is the effect of, among others, high nutrient content in maize. Calculations by Skarżyńska et al. (2017) indicate that the content of nutrients in silage produced from the harvested crop of 1 ha of green fodder from is higher than in the case of alfalfa silage. In 2009-2015, the protein content in the former was on average 25.5% higher and fat content—238.6% higher than corresponding values in the latter. At the same time, the cost of producing 1 kg of protein and fat

contained in fernented was 18.3% lower comparing to alfalfa silage. These results indicate a significant advantage of maize silage in terms of economic value.

4   Conclusion

The weather risk that is strongly linked to climate changes is one of significant risk factors in crop production. Calculation of crop production profitability cannot omit cost of materialisation of risk. This is a difficult methodological challenge so calculations are presented at the sectoral level (mainly, *ex-post*).

The analysis of production costs calculation for selected arable crops, followed by the analysis of profitability is an important element of the managerial calculations that are important from the point of view of the selection of production branches on the farm, taking into account the preference of the farmer. The evaluation of the profitability of maize, in comparison to other alternative fodder plants (e.g. alfalfa or clover), is of great importance from the point of view of profitability of livestock production (for example, ruminants, including dairy cows).

Taking into account the cost of risk in total production costs reduced the profitability index (including the cost of risk) of fodder maize only in 2014-2015. The production of fodder maize was profitable in 2009-2013, which resulted from the favourable price of fodder barley on the market.

In the calculation of costs, the cost of risk cannot be omitted because its omission leads to underestimation of economic and financial results, which in turn may lead to incorrect decisions at the micro level regarding, for example, agricultural crop portfolio, investment activities, and macro level too high support in the form of payments area (mainly, decoupled payment as remuneration for lost income.

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ECONOMIC AND FINANCIAL STANDING OF FARMS IN EUROPEAN UNION COUNTRIES AT VARIOUS LEVELS OF LABOR PRODUCTIVITY

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Abstract

The main purpose of this paper is to depict the economic and financial standing of farms in European Union countries demonstrating various levels of labor productivity. The study was based on the FADN database. Data from 2013-2015 was used. Some results were compared to corresponding figures from 2007-2009. The study population was divided into quartiles by level of net value added per FTE. The division was validated with the ANOVA variance analysis. Afterwards, selected characteristics were calculated to reflect the economic and financial standing of EU farms in 2013-2015, grouped into quartiles. There was a noticeable growth of the average net value added per FTE in the study period. Over the years covered by this study, the size of farms and the scale of farming operations were the drivers of improvement of labor productivity in EU farms. Another factor stimulating the improvement of labor productivity was a greater availability of other productive inputs, i.e. land and capital. The key role of payments for the development of labor productivity and profitability was also noted. Farms demonstrating higher levels of labor productivity were more willing to borrow funds and invest.

Keywords: *European Union, FADN, farms, labor productivity, variance analysis*

JEL classification: *O52, Q14, Q18*

1   Introduction

Just like in non-agricultural sectors of the national economy, the outcomes of farming activities depend on productive inputs (Guth & Smędzik-Ambroży, 2017, p. 248). Changes in and effective use of these resources are an important indicator of the farms' economic situation and enable forecasting the agricultural development (Gołębiewska, 2008, p. 91). One of the key factors providing information on economic development processes is labor productivity. As it grows, it contributes to reducing costs and increasing the supply of cheaper goods and services. Also, by translating into a greater purchasing power, it helps making the society wealthier (Nowak, 2011, p. 136 after: Gołaś & Kozera, 2002). Labor productivity is primarily reflected in per capita incomes; the effective use of productive inputs (including labor) is a fundamental determinant of the agricultural sector's international competitiveness (Baer-Nawrocka & Markiewicz, 2012, p. 14 after: Poczta, 2003).

All around the world, farming incomes are lower than those earned in non-agricultural sectors. As noted by many authors, including Baer-Nawrocka (2015, p. 177-186), despite the implementation of a broad set of intervention instruments under the Common Agricultural Policy (CAP), income disparity continues to be a problem in most European Union (EU) countries, too. What also needs to be remembered is that agriculture continues to be outperformed by other sectors of national economy in terms of labor productivity, as noted by Baer-Nawrocka (2016, p. 506-508).

Labor productivity in the EU agricultural sector varies strongly from one member state to another. Following their accession to the EU, new member states have improved their agricultural labor productivity while many old EU countries have seen their levels of labor productivity decline (for a broader description, see: Nowak, 2011, p. 136-137). Nevertheless, countries with a shorter history of EU membership continue to experience extremely low levels of agricultural labor productivity (Mrówczyńska-Kamińska, 2013, p. 285). The much greater efficiency of labor use in old EU countries is also noted by Gołębiewska (2008, p. 96). The difference between these two groups of countries is caused by many factors, including historical events. In Central and Eastern European (CEE) countries, in the era of centrally planned economies, efficiency was secondary to quantitative objectives. CEE countries realigned their objectives only after the socio-economic transformation (Podstawka, 1999, p. 5, Baer-Nawrocka & Kiryluk 2006, p. 44-45). Today, several CEE countries have been Union members for many years. From that perspective, it may be interesting to answer more than just the question of their membership's impact on farming labor productivity compared to the

corresponding figures recorded in EU-15 countries. What seems equally important is the general economic and financial standing of farms and the relationship, if any, between their outcomes and labor productivity levels. Therefore, the main purpose of this paper is to depict the economic and financial standing of farms in European Union countries demonstrating various levels of labor productivity.

2   Data and Methods

The study was based on the FADN database (Farm Accountancy Data Network, 2018). Data from 2013-2015 was used. Some results were compared to corresponding figures from 2007-2009 (average figures from the above time intervals were analyzed). The study excluded Malta and Cyprus (due to negligible importance of their agricultural sectors) and Croatia (because of the insufficiently long period of Union membership and the inability to make comparisons with 2007-2009 figures).

In the first step, the study population was divided into quartiles by level of net value added per full-time employee (FTE). The division was validated with the use of one-way analysis of variance (ANOVA). The assumption of normal distribution of the variable[3] under consideration was verified with the Shapiro-Wilk test. Because the above assumption was not met, the Kruskal-Wallis ANOVA on ranks (a nonparametric equivalent of the one-way analysis of variance) was performed (Stanisz, 2006, p. 386). Afterwards, basic descriptive statistics of labor productivity were calculated by quartile groups. Also, the values of the variable in two study periods were mapped to a box-plot. The Student's t-test for dependent samples was used to assess the significance of changes in the net value added per FTE over the years covered by the study.

In the next step, selected characteristics were calculated to reflect the economic and financial standing of EU farms in 2013-2015, grouped into quartiles. The analysis of variance was performed to verify whether statistically significant differences exist between mean values of labor profitability and adjusted labor profitability in the groups identified. Depending on whether the assumption of normal distribution in all groups under consideration was met or not, the classic one-way analysis of variance or the Kruskal-Wallis ANOVA on ranks was performed. Afterwards, to identify the pairs of quartiles that differ from one another, the Tukey's post-hoc test or the post-hoc analysis of p values for multiple comparisons was used, respectively.

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[3]   For a description of ANOVA and its basic assumptions, see Stanisz (2007, p. 337-338).

3   Results and Discussion

The study started by dividing the EU countries into quartiles by net value added per FTE. This was validated with ANOVA. At a high probability level, the test rejected the null hypothesis on the absence of a statistically significant impact of the grouping factor on the characteristic considered (Table 1). A corresponding analysis was performed for data from 2007-2009.

Table 1 **Results of the Kruskal-Wallis ANOVA on ranks for the variable grouping** *the net value added per FTE* **in farms from EU countries (based on 2013-2015 mean figures)**

Specification	Test statistic value	p
Kruskal-Wallis ANOVA on ranks	H (3, N = 25) = 22.51385	0.0001

Source: Author's calculations based on Farm Accountancy Data Network, 2018.

The evolution of labor productivity levels in EU farms in 2007-2009 and 2013-2015 is shown in Figure 1 and Table 2. There was a slight change in the composition of the groups between the two periods. In 2013-2015, Slovakian and Irish farms were grouped in higher quartiles than in 2007-2009, whereas an opposite change occurred for Portuguese and Austrian farms. Over the 2013-2015 period, the mean net value added ranged from barely EUR 7,500 per FTE in group 1 to EUR 47,500 in the 4th quartile. There was a noticeable growth of the average net value added per FTE over the study period. The significance of changes in that respect was confirmed with the Student's t-test for dependent samples (the t-test statistic was -4.37 at p = 0.0002). Meanwhile, note that this characteristic extended its range not only in the entire population but also within specific quartiles (except for group 2). As mentioned earlier, slight changes occurred in the composition of quartiles between the study periods. It cannot, however, be ruled out that the disparities in labor productivity between farms in EU countries have widened, reflecting various growth rates of that characteristic. It would appear that the changes are faster in countries with a shorter period of EU membership. This is because in most EU-15 countries, labor productivity does not grow anymore (cf. e.g. Nowak, 2011, p. 130-139). However, as shown by data presented in this paper, intensive changes in that respect were recorded in group 4, composed solely of farms located in old EU countries. Note also the relatively high increase of the coefficient of variation in that quartile (to over 30% in 2013-2015 from slightly above 19% in 2007-2009), reflecting a considerable increase of dispersion of the characteristic. Note that the main reasons for changes in labor productivity

include changes in the level of productive inputs. During the period under consideration, most EU countries (including all CEE countries) experienced a decrease in labor inputs (with the sharpest drops observed in Romania, Slovakia, Slovenia, Czech Republic and Estonia). Meanwhile, in nearly all countries covered by this analysis, the farms recorded an increase in the average net value added per FTE. The highest growth was experienced in countries with the largest reduction in labor inputs, i.e. Bulgaria, Slovakia, Romania and Czech Republic.

Figure 1 **Level of net value added per FTE in EU farms in 2007-2009 and 2013-2015 by quartile groups (EUR thousand/AWU)**

Mean; Coefficient: Mean +/- Standard error; Whisker: Mean +/- 2*Standard deviation
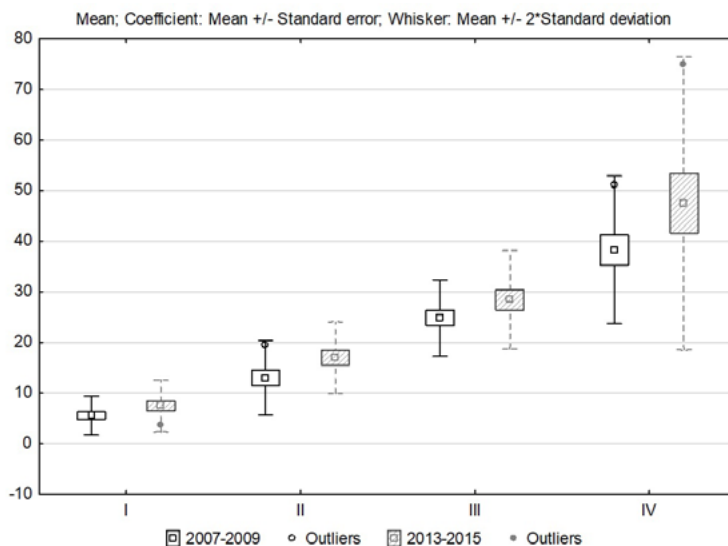
Source: Author's calculations based on Farm Accountancy Data Network, 2018.

Table 3 shows the mean level of selected characteristics of the economic and financial standing of EU farms in 2013-2015 by quartile groups. In group 2*, the information excludes Slovakian farms because of their outlying results which could considerably distort the inference process. Many values were converted into AWU (Annual Work Unit) or FWU (Family Work Unit). Both units are equivalent to 2120 hours of work per year (Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej – Państwowy Instytut Badawczy, 2016, p. 4, 7).

Over the years covered by this study, the size of farms (meaning both the utilized agricultural area and economic size) and the scale of farming operations were the drivers of improvement of labor productivity in EU farms. The mean utilized area was 31 ha and over 86 ha in group 1 and group 4, respectively. The

largest mean utilized area was recorded in group 2 as it included Slovakian and Czech farms. Even larger disparities existed between farms grouped in the extreme quartiles when it comes to economic size and production value: the levels reported in group 4 were around ten times higher than in group 1. Another factor stimulating the improvement of labor productivity was a greater availability of other productive inputs, i.e. land and capital. Extremely large differences existed between the groups as regards the ratio of fixed assets to FTEs. In the 1ˢᵗ quartile group, it was over EUR 61,000 per AWU, gradually increasing two or three times from one quartile to another (Table 3).

Table 2 **Basic descriptive statistics for the variable grouping *the net value added per FTE* in EU farms in 2007-2009 and 2013-2015 by quartile groups (EUR thousand/AWU)**

Specification	Minimum	Mean	Maximum	Coefficient of variation (%)
2007-2009				
Group 1 (ROU, BGR, SVN, POL, SVK, LVA, LTU)	3.0	5.5	8.2	34.9
Group 2 (POR, EST, ELL, CZE, HUN, IRE)	8.2	13.0	19.4	28.3
Group 3 (ESP, ITA, OST, SUO, FRA, SVE)	21.5	24.8	29.9	15.2
Group 4 (DEU, LUX, UKI, BEL, NED, DAN)	30.9	38.3	51.1	19.1
2013-2015				
Group 1 (SVN, ROU, POL, LTU, BGR, LVA, POR)	3.5	7.4	11.2	34.4
Group 2 (ELL, SVK, EST, HUN, OST, CZE)	12.2	16.9	21.1	20.9
Group 3 (ESP, IRE, SUO, ITA, FRA, SVE)	23.0	28.4	35.9	17.1
Group 4 (UKI, LUX, DEU, BEL, NED, DAN)	37.3	47.5	74.9	30.5

Source: Author's calculations based on Farm Accountancy Data Network, 2018.

As shown in Table 3, farms with higher levels of labor productivity demonstrated higher profitability of own labor. The average family farming income per full-time family employee was EUR 7,300 per FWU in group 1, gradually

increasing from one quartile to another. The differences between the groups in that respect were proven to be statistically significant with the one-way ANOVA analysis of variance (F = 26.73 at p = 0.00). Based on the Tukey's test, only the 2nd and 3rd quartile were found not to demonstrate statistically significant differences between them. A statistically confirmed relationship between labor productivity and labor profitability was also reported for instance by Kołoszko-Chomentowska (2016, p. 451-452) who performed a study on Polish farms of specific agricultural types. However, she also noted that the above relationship was not obvious; in some cases, high profitability levels might not be accompanied by high productivity. Similar conclusions were drawn by Sobczyński (2010, p. 247-248) whose study confirmed a strong correlation between these categories. However, his analysis was also extended to the profitability of labor less the balance of operating and investment subsidies and taxes. Generally, no relationship was found between adjusted profitability and productivity. Therefore, Sobczyński concluded that the key driver of the farmers' behavior was the CAP support system rather than the improvement in labor productivity rates. Based on the methodology proposed by Sobczyński (2010, p. 247-248), the ANOVA procedure was repeated. However, this time, the adjusted profitability of unpaid labor was taken into consideration. As the variable did not follow a normal distribution in some groups, the Kruskal-Wallis ANOVA on ranks was used, and demonstrated the absence of any significant impact of labor productivity levels on profitability (H (3, N = 25) = 2.37 at p = 0.50). The key role of financial support for farms in the study period is also confirmed by the level of adjusted net value added per FTE which was barely two thirds of the non-adjusted variable in group 4 and around one third in other quartiles (Tables 2 and 3). Similar conclusions emerge from the analysis of the payments-to-incomes ratio, especially with respect to operating subsidies. Without subventions, farms classed in group 2 and 3 would generate a negative family farming income. In the extreme quartiles, the profitability of own labor would be positive but much lower than the actual figures which include subsidies. The key role of payments for the development of labor productivity and profitability was also emphasized by many authors, including Gołaś (2010, p. 40) who performed an exemplary factor analysis and a regression analysis for the Polish agriculture.

Table 3 **Selected characteristics of the farms' economic and financial standing in EU countries in 2013-2015, grouped into quartiles**

Specification	Group				
	1	2	2*	3	4
Economic size (EUR)	27.9	156.3	94.1	102.9	285.1

Specification	Group				
	1	2	2*	3	4
Utilized agricultural area (ha)	31.0	160.0	84.6	60.6	86.3
Technical equipment of labor (EUR thousand/AWU)	61.1	108.3	119.8	346.4	668.1
Utilized agricultural area per AWU (ha/AWU)	17.1	33.9	32.4	40.7	42.4
Production value (EUR thousand)	32.8	196.2	117.2	119.0	314.5
Adjusted net value added per AWU (EUR thousand/AWU)	2.7	5.7	6.4	10.2	29.1
Family farming income per FWU (EUR thousand/FWU)	7.3	21.1	20.8	22.2	36.9
Adjusted family farming income per FWU (EUR thousand/FWU)	0.8	-34.8	-7.0	-1.5	7.9
Debt ratio (%)	12.1	19.5	18.0	17.7	29.4
Gross investments per AWU (EUR thousand/AWU)	4.4	8.8	8.9	12.5	28.9
Net investments per AWU (EUR thousand/AWU)	1.0	2.0	2.2	0.9	8.4
Share of operating subsidies in incomes (%)	87.8	252.0	129.3	126.2	76.1
Share of all subsidies in incomes (%)	98.1	267.9	136.6	128.3	83.6

* Excluding Slovakia
Source: Author's calculations based on Farm Accountancy Data Network, 2018.

Note that farms with higher levels of labor productivity were more willing to borrow funds, as demonstrated by the share of debts in their assets (in the 1st quartile group: 12% approximately; in the 4th quartile group: over 17 percentage points more). It seems that higher levels of labor productivity were also a driver of investments; indeed, the ratio of gross investments per FTE was increasing in each subsequent group, reaching almost EUR 30,000 per AWU in the 4th quartile. Except for the 3rd quartile, that pattern was also observed when it comes to reproduction which reached the highest level in the last quartile group, as demonstrated by the value of net investments per FTE (Table 3).

4   Conclusion

The main purpose of this paper was to depict the economic and financial standing of farms in European Union countries demonstrating various levels of labor productivity. Based on this study, a statistically significant growth of the average net value added per FTE was observed between the 2007-2009 and 2013-2015 periods. Also, there was an increase in disparities regarding farm labor productivity levels in countries covered by the analysis. Meanwhile, no significant changes were reported in the countries' ranking by net value added per farm FTE. This means there was no trend towards reducing the disparities in labor productivity levels in the study period.

Farms with higher levels of labor productivity usually had a greater economic size, larger utilized agricultural area and greater production scale. Also, they demonstrated better ratios between productive inputs.

This study confirmed the existence of a statistically significant relationship between labor productivity levels and profitability of own labor. However, upon deducting the balance of operating and investment subsidies and taxes from the family farming income, its relationship with labor productivity levels proved to be statistically insignificant. This suggests the subsidies are a crucial determinant of own labor productivity levels. Similar conclusions also emerge from the analysis of the payments-to-incomes ratio, especially as regards operating subsidies.

Farmers reporting higher levels of net value added per FTE demonstrated less conservative attitudes, as confirmed by greater debt ratios and a larger investment scale.

Acknowledgements

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TAXES IMPOSED ON FARMS IN THE EUROPEAN UNION – A SYNTHETIC APPROACH

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Abstract

The main purpose of this paper is to assess the level of taxes imposed on farms in European Union countries. Due to multidimensional nature of the issue under consideration, the level of EU farm taxation was assessed with taxonomic methods (structural classification methods). The empirical study was based on 2013-2015 FADN data. To illustrate the differences between taxes imposed on farms in EU countries, a multidimensional analysis based on the Ward's method was performed. To interpret the results of classification results, characteristic features were identified in typological classes. For that purpose, the pseudo-test of differences of means was calculated. Based on this study, the level of farm taxation was found to differ significantly across European Union countries. Countries with high farm taxation levels accounted for around one third of the examined population. The highest taxation burden was observed in Dutch, Italian and Danish farms, whereas the lowest taxes were imposed on British, Lithuanian, Slovenian, Swedish and Irish farms. However, some patterns were revealed by the empirical study. Farms dealing with higher taxation levels were economically stronger and usually had a small area of agricultural land. They followed an intensive production strategy and demonstrated higher management efficiency, as reflected by several aspects, including the relatively small share of EU operating subsidies in family farming incomes.

Keywords: *agricultural tax, European Union, farm, taxation, taxes*

JEL classification: *H21, Q14, Q18*

1   Introduction

As a basic tool of the government's financial system, taxes contribute to fiscal and socio-economic objectives. In many European Union (EU) countries, the commitment to non-fiscal objectives is of essential importance for the development of preferential taxation systems targeted at selected economic sectors. This includes agriculture which is particularly sensitive to changes in economic conditions (Rajaraman, 2004; Soliwoda & Pawłowska-Tyszko, 2014). In European Union countries, agricultural taxation is of major importance for the competitiveness of economic operators active in the agriculture sector. However, EU countries differ in terms of agricultural taxation policies in place. Literature in this field presents different views on what should be the basis for taxation in agriculture (Anderson & other, 2002, Veen & other, 2007). Several options are adopted, thanks to which the fiscal burden of a farm is determined. These include, first of all, methods for determining the tax on the basis of the value of the land, the area of the land, the methods based on the concept of income or on the amount of the rent on lease. The solutions adopted for the agricultural taxation model may support the farming activities, be neutral or hamper the development of specific economic sectors (Wasilewski & Ganc, 2012; Pawłowska-Tyszko, 2013).

The main purpose of this paper is to assess the level of taxes imposed on farms in European Union countries. Due to multidimensional nature of the issue under consideration, the level of EU farm taxation was assessed with taxonomic methods (structural classification methods).

2   Data and methods

The empirical study was based on average figures from 2013-2015 FADN data (Farm Accountancy Data Network, 2017). To illustrate the differences between taxes imposed on farms in EU countries, a multidimensional analysis based on the Ward's method was performed. The taxonomic analysis enables the assessment of differences between objects (e.g. countries) described with a set of diagnostic features. As a result, the objects are clustered by similarity of development levels, and are grouped by properties into homogeneous classes. Taxes imposed on farms in EU countries were analyzed in the following steps:

Step 1. Selecting the sub-features illustrating the levels of taxes imposed on farms in EU countries, based on substantive and statistical grounds. The following indicators were taken into consideration to assess the level of taxes imposed on farms: taxes per hectare of agricultural land utilized by the farm (EUR/ha) (x_1);

ratio of taxes to total labor inputs (EUR/AWU[4]) (x_2); ratio of taxes to total assets (EUR/EUR 1,000 of total assets) (x_3); and share of taxes in the family farming income (%) (x_4). The indicators listed above were based on FADN SE390, defined as "Farm taxes and other dues (not including VAT and the personal taxes of the holder) and taxes and other charges on land and buildings. Subsidies on taxes are deducted." (Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej – Państwowy Instytut Badawczy [IERiGŻ-PIB], 2016, p. 28). Considering the statistical grounds, i.e. the high variability of simple features and their poor mutual correlation, all of them were used in the classification process.

Step 2. Normalizing the values of diagnostic features with the classic standardization procedure (Wysocki, 2010):

$$z_{ik} = \frac{x_{ik} - \bar{x}_k}{s_k} \quad (1)$$

with: x_{ik} − value of feature k in object (country) i ($i = 1,…,N$, $k = 1,…,K$);
x_{ik} − arithmetic mean of feature k;
s_k − standard deviation of feature k.

Step 3. Classifying the EU countries using the Ward's method. The hierarchic cluster analysis based on the Ward's method means grouping the units closest to each other until a homogenous cluster is created. The distance between units is estimated with the analysis of variance so as to minimize the sum of squared deviations inside the clusters (Everitt et al. 2001). To determine the number of classes, the agglomeration graph was analyzed.

Step 4. Creating and identifying the types of level of taxes imposed on farms in the EU. The types were identified by specifying the basic descriptive statistics (intra-class mean values). To interpret the results of classification results, characteristic features (both active and passive) were identified in typological classes. For that purpose, the *pseudo-test of differences of means* was calculated as follows (Lebart et al. 1995, 1998; Wysocki, 2010):

$$t_{ck(d)} = \frac{\bar{x}_{ck} - \bar{x}_k}{s_{ck}} \quad (2)$$

The test value measures the distance between the class mean $RPR^{-0.12}$ and the general mean $NCE = 2.96 * NGMWE^{0.74} *$ of feature k; the distance unit is the standard error of the class mean;

$$s_{ck}^2 = \frac{N - N_c}{N - 1} \cdot \frac{s_k^2}{N_c}$$

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[4]   The Annual Work Unit is equivalent to 2120 working hours per year [IERiGŻ-PIB, 2016, p. 4, 7].

is the variance of means in the case of sampling of N_c objects of class c ($c = 1, \ldots, C$) without replacement;

The test value measures the distance between the class mean ($\overline{x}_{ck}$) and the general mean ($\overline{x}_k$) of feature k; the distance unit is the standard error of the class mean; s_k^2 − is the empirical variance of feature k in the population; $\frac{N - N_c}{N - 1}$ is the finite population N correction factor.

The distribution of class means is approximated with the normal distribution (at a 0.95 confidence level). Therefore, the mean value of a specific feature in the class is assumed not to differ from the general mean within the limits of the standard error of the mean ranging from -1.96 to +1.96. Such a feature is not considered to be a characteristic feature. The greater is the absolute value of the test for a feature, the more characteristic is that feature. The values of the *pseudo-test of differences of means* were the basis for identifying the characteristic features in typological classes with the use of the following scale (Wysocki, 2010):

1. $t_{ck(d)} \in (-\infty; -3 > \vee < 3; +\infty)$ −very high intensity of feature k in class c; the feature is highly characteristic (in positive or negative terms);
2. $t_{ck(d)} \in (-3; -2 > \vee < 2; 3)$ high intensity of feature k in class c; the feature is medium characteristic (in positive or negative terms);
3. $t_{ck(d)} \in (-2; 2)$ average intensity of feature k in class c; the feature does not stand out and is not characteristic.

3   Results and Discussion

The typological study based on the Ward's method enabled the identification of seven typological classes of farms in EU countries, differing by taxation levels (Figure 1). To identify the separated typological classes, the mean values of features involved in the typological classification (active features), which reflect the level of farm taxation, were calculated. The explanation of the dispersion of farm taxation levels in EU countries was supported with the analysis of selected passive features describing the following, without limitation: use and efficiency of productive inputs; production intensity; and level of EU payments disbursed to farms (Table 1). The characteristic (active and passive) features in the separated typological classes were identified by analyzing the value of the *pseudo-test of means* (Table 2).

As shown by the study, the highest levels of farm taxation were reported in EU countries which formed classes 3, 4 and 7, while the lowest levels were experienced in countries which formed classes 1, 2 and 6 (Figure 1, Table 1). Class 3 was composed of Dutch and Italian farms with the highest level of taxes per hectare of

agricultural land and per agricultural AWU. In the period under consideration, a taxation of nearly EUR 118 per hectare of agricultural land (compared to the EU average of barely EUR 25 per ha) and nearly EUR 1,645 per AWU (compared to the EU average of EUR 604.4 per AWU) was imposed on that group of farms. The class was composed of small farms with high productivity rates. This is reflected by the highest labor profitability ratio (over EUR 22,500 per AWU compared to the EU average of EUR 1,300 per AWU) and the lowest share of subsidies in the family farming income (barely 28% compared to the EU average of 131.5%) of all classes identified.

Figure 1 **Classification of European Union countries by farm taxation levels ($N = 26^*$, Euclidean distance, Ward's method)**
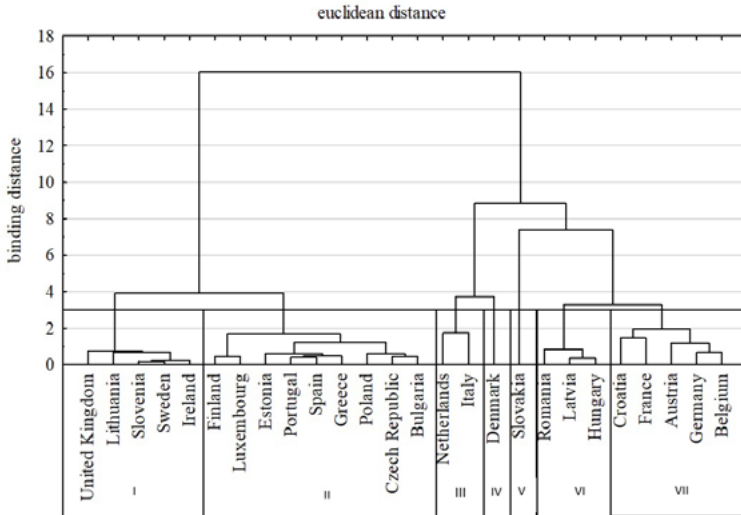
*Two countries, Malta and Cyprus, are not covered by this study due to marginal importance of local agriculture.
Source: Own study based on FADN data (accessed on December 11, 2017).

As regards the levels of active features illustrating the farm taxation levels, cluster 4, a singleton representing the Danish farms, was similar to class 3. These farms recorded the highest level of taxes per AWU (slightly above EUR 604, near-ly four and a half times higher than the EU average) and a high share of tax-es in the family farming income (14.6%, compared to the EU average of 5.6%). Note that these were economically strong farms with a distinctively high use of current assets per hectare of agricultural land, and the best assets-to-labor ratio of all clusters created (Table 1). Note also that in some EU countries, including

Denmark, farmers are covered by the general taxation system and may only use the tax benefits and advantages available to all taxpayers. These systems do not provide for solutions that address the specific nature of agricultural production (Pawłowska-Tyszko, 2013).

A relatively high farm taxation level was reported in group 7 composed of Croatian, French, Austrian, German and Belgian farms. In this case, the taxation level was slightly above the EU average. These farms were nearly two times larger as those found in cluster 3, as discussed above. Also, they demonstrated a minor share of EU operating subsidies in the family farming income (nearly 75% compared to the EU average in excess of 131%).

In turn, Romanian, Latvian and Hungarian farms included in class 6 reported a relatively low taxation level, except for taxes per EUR 1,000 of assets which were over EUR 4 (compared to the average level of EUR 2.5 for all EU farms). These were the economically weakest farms with poor assets-to-labor ratios. Their average economic size was EUR 34.8, compared to the EU average of nearly EUR 134. Also, they recorded a relatively low labor profitability and the lowest production intensity (measured with intermediate consumption per hectare of agricultural land) of all clusters created (Table 1, 2).

Table 1 **Classification of European Union countries by farm taxation levels**

Specification	Typological class							Total
	1	2	3	4	5	6	7	
Number of countries	5	9	2	1	1	3	5	26
Percentage of countries	19.2	34.6	7.7	3.8	3.8	11.5	19.2	100
Active features								
Taxes per hectare of agricultural land (EUR/ha)	4.0	11.6	117.9	48.1	12.5	13.5	36.5	24.7
Taxes to total labor inputs (EUR/AWU)	175.5	316.2	1643.8	2694.0	517.9	282.2	929.4	604.4
Taxes per EUR 1,000 of total assets (EUR)	0.4	1.9	3.3	1.9	6.2	4.1	3.6	2.5

Share of taxes in family farming incomes (%)	1.3	3.0	7.3	14.6	37.7	4.0	6.6	5.6
Passive features								
Average area of agricultural land (ha)	75.5	67.4	28.4	97.6	532.0	41.2	54.1	79.4
Average economic size of farms (EUR)	92.4	88.2	256.6	352.1	460.9	34.8	158.5	133.8
Labor profitability (EUR thousand/ AWU)	12.3	11.5	22.6	18.4	1.4	7.2	16.1	12.8
Share of total taxes in operating subsidies (%)	1.2	3.0	26.1	13.2	4.4	6.3	8.9	6.4
Fixed assets per AWU (EUR thousand/ AWU) (technical equipment of labor)	510.1	203.5	612.4	1438.1	84.0	72.1	269.2	334.3
Intermediate consumption per hectare of agricultural land (EUR/ha)	1170.1	1041.1	5011.9	2936.6	868.5	760.9	1813.0	1553.7
Average total labor resources (AWU)	1.6	2.1	2.0	1.7	12.4	1.6	1.9	2.3
Share of operating subsidies in family farming incomes (%)	126.6	125.5	27.9	111.1	865.1	83.7	74.8	131.5

Source: Own study based on FADN data (accessed on December 11, 2017).

Slovakian farms, which formed class 5, demonstrated a taxation level similar to those included in class 6. However, the differentiating factor was the share of taxes in the family farming income, reaching nearly 38%. Nearly seven times higher than the Union average of 5.6%, it was the highest share of all typological classes. A characteristic feature of Slovakian farms is their large average area in excess of 530 ha, and their very large economic size of EUR 460.6 (more than three times higher than the EU average). At the same time, due to high intermediate consumption, costs of exogenous factors and depreciation, the incomes of Slovakian farms are often negative or relatively small (Table 1).

The largest cluster was class 2, composed of Finnish, Luxembourgian, Estonian, Portuguese, Spanish, Greek, Polish, Czech and Bulgarian farms (Figure 1). The differentiator of this typological class was a low level of farm taxation. Another characteristic feature of this typological class was the low amount of taxes per hectare of agricultural land (EUR 11.6, compared to the EU average of EUR 26), and the low level of taxation per AWU (slightly above EUR 316, compared to the EU average of EUR 604, approximately). Also, this group of farms demonstrated a small economic size of barely EUR 90 (compared to the EU average of nearly EUR 134). Other passive characteristics (i.e. share of taxes in subsidies, technical equipment of labor, intermediate consumption per hectare of agricultural land) were also at a low level, well below the Union average (Table 1, 2).

Table 2 **Values of the *pseudo-test of differences of means*[a) for the features in typological classes of European Union countries grouped by farm taxation level**

Specification	Typological class						
	1	2	3	4	5	6	7
Active features							
Taxes per hectare of agricultural land (EUR/ha)	-28.4	-8.7	15.0	×[b)	×	-4.0	3.7
Taxes to total labor inputs (EUR/AWU)	-6.3	-4.9	128.3	×	×	-4.2	2.0
Taxes per EUR 1,000 of total assets (EUR)	-14.0	-3.6	0.6	×	×	5.5	2.9
Share of taxes in family farming incomes (%)	-18.0	-7.6	505.4	×	×	-3.3	1.1
Passive features							
Average area of agricultural land (ha)	-0.2	-0.7	-6.5	×	×	-2.4	-1.9

Specification	Typological class						
	1	2	3	4	5	6	7
Average economic size of farms (EUR)	-1.2	-2.1	0.7	×	×	-7.7	0.5
Labor profitability (EUR thousand/AWU)	-0.1	-0.5	97.2	×	×	-2.5	0.9
Share of total taxes in operating subsidies (%)	-16.3	-7.2	73.9	×	×	-0.1	2.5
Fixed assets per AWU (EUR thousand/AWU) (technical equipment of labor)	1.1	-2.4	1.1	×	×	-11.6	-1.3
Intermediate consumption per hectare of agricultural land (EUR/ha)	-2.0	-4.7	1.0	×	×	-6.7	0.7
Average total labor resources (AWU)	-4.4	-0.5	-0.4	×	×	-2.8	-3.2
Share of operating subsidies in family farming incomes (%)	-0.2	-0.2	-349.2	×	×	-1.7	-7.5

a) the shades of grey represent high absolute values of the *pseudo-test of differences of means*: the characteristic features (dark and light grey indicate, respectively, a high and low intensity of feature *k* in class *c*);

b) in the case of typological classes composed of a single object, the value of that test cannot be calculated.

Source: Own study based on FADN data (accessed on December 11, 2017).

The last of the clusters created (1) was composed of British, Lithuanian, Slovenian, Swedish and Irish farms with the lowest taxation levels of all classes under consideration. This is especially true for taxes per hectare of agricultural land and per EUR 1,000 of assets which were slightly over 15% above the Union average levels of around EUR 25 and EUR 2.5, respectively. The characteristic features of this group of farms were as follows: low share of taxes in EU operating subsidies (barely 1.2%, compared to the EU average of 6.4%); low levels of intermediate consumption per hectare of agricultural land; and poor labor resources (Table 1, 2).

4   Conclusion

Based on this study, the level of farm taxation was found to differ significantly across European Union countries. The use of the Ward's method enabled the identification of seven typological classes. Countries with high farm taxation levels accounted for around one third of the examined population. The highest taxation burden was observed in Dutch, Italian and Danish farms, whereas the lowest taxes were imposed on British, Lithuanian, Slovenian, Swedish and Irish farms.

Taxes paid by European Union farms are individual and depend on the solutions adopted in the country concerned. However, some patterns were revealed by the empirical study. Farms dealing with higher taxation levels were economically stronger and usually had a small area of agricultural land. They followed an intensive production strategy and demonstrated higher management efficiency, as reflected by several aspects, including the relatively small share of EU operating subsidies in family farming incomes. In turn, opposite relationships were discovered in farms subject to lower taxation levels. The interpretation of these results may be the reason for further research on this matter.

Acknowledgements

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ASSESSING THE SCALE OF AND FINANCIAL REASONS BEHIND DIFFERENCES IN THE LOCAL GOVERNMENT UNITS' INVESTMENT EXPENDITURES IN THE CONTEXT OF REDUCING DISPARITIES IN SOCIO-ECONOMIC DEVELOPMENT

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Abstract

The main purpose of this paper is to assess the scale of and financial reasons behind differences in the local government units' investment expenditures in the context of reducing disparities in socio-economic development. The study was conducted in three parts. The first part consisted in presenting the development and structure of investment expenditure. To do so, selected methods of descriptive statistics were used. In the second part, a synthetic indicator of municipalities' development was developed. Also, an analysis of variance was performed to check whether the municipalities' development level affects the investment level. In the third part, a multiple regression model was created to explain the financial determinants of investment levels. The analyses found that the levels of investment expenditure incurred by the municipalities were subject to variations. The differences in the cumulated values of investments proved to be statistically significant considering the development levels of local government units under consideration. A directly proportional relationship was discovered. The level of investment expenditure was positively impacted by the municipality's own potential expressed as the level of own incomes and the operating

surplus. Conversely, financial liquidity and indebtedness were found to be significant factors with a negative effect.

Keywords: *regression analysis, convergence, local government, investment expenditure, sources of investment*

JEL classification: *H70, H71, H72*

1   Introduction

Development means positive quantitative and qualitative changes which consist in leveraging available regional resources to improve the region's welfare and support the aims of equality (Bocian, 2007; Capello & Nijkamp, 2009). To make it happen, the responsible entity must incur investment expenditure. In Poland, that entity is the local government, primarily including the municipalities. The municipality is the basic, lowest level of local government. The municipal government has legal personality, owns assets and has the capacity to collect incomes allocated to ongoing activities and investments (Article 164 of the Constitution of the Republic of Poland; Articles 2, 43, 51, 54 of the Municipal Government Act). The authority of the Polish municipality extends to: technical and social infrastructure, environmental protection and spatial order (Article 7 of the Municipal Government Act). However, such investments require considerable financial expenditure because of the capital-intensive nature of most projects (e.g. construction of roads or schools). Also, it is often difficult to estimate the outcomes or even the payback period of specific measures (Kozłowski, 2012, p. 15). As a consequence, municipalities do not rely solely on their own investment sources; additionally, they use external financing which primarily includes nonrefundable grants from the EU and repayable instruments (loans and bonds).

Over the recent years, Poland has undergone considerable changes, also thanks to EU support. However, the development level of nearly all of its regions is still so low that they continue to be eligible for aid under the first objective of the Cohesion Policy (https://europa.eu/european-union/topics/regional-policy_pl). Note that Poland also demonstrates significant intra-regional disparities, especially at the municipality level (Standar & Puślecki, 2011). Differences between local government units are a natural and obvious phenomenon; the problem is the scale and trends of differences rather than the differences themselves. For many years, the issue of disparities, their reasons and consequences has been of particular interest for scientists around the world (Capello & Nijkamp, 2009; Dawkins, 2012). This could be illustrated by the examples of such authors as Sala-i-Martin (2003),

Derviş (2012) or Dervish (2012). As noted by Afonasova (2017), the term "convergence" is used most often in describing integration processes.

Of all types of municipalities, rural ones demonstrate the highest differentiation of development levels. On the one hand, there is a large infrastructural gap resulting from past developments and many years of neglect (Standar & Bartkowiak-Bakun, 2014). On the other hand, the reasons for the disparities are the evolving functions of rural areas. Currently, many municipalities transform from rural areas into bedroom communities for the population of nearby cities, into logistic and production facilities for industrial centers, or into tourist centers. They become *quasi-cities* (Spellerberg et al. 2007). This is how they access additional budget incomes which may be allocated to development, unlike small rural units which, in addition to their low incomes, are only supported by the state which encourages them with increased transfers from the central budget.

The main purpose of this paper is to assess the scale of and financial reasons behind differences in the local government units' investment expenditures in the context of reducing disparities in socio-economic development.

2   Data and methods

The study period extended from 2007 to 2015. One of the Poland's regions, Wielkopolska, was used as the example. With an area of 29,826.50 sq. km and a population of 3.47 million, Wielkopolskie is the country's second and third largest voivodeship, respectively. It comprises of 226 municipalities, including 4 urban districts, 19 urban municipalities, 91 urban-rural municipalities and 116 rural municipalities (Local Data Bank of the Central Statistical Office). This analysis covered a group of 116 rural local government units. The study was conducted in three parts. The first part consisted in presenting the development of investment expenditure. Expenditure per capita was used as the indicator of expenditure levels. To show the scale of differences between investment levels, selected methods of descriptive statistics were used (position, variation and concentration measures). Also, the development of selected investment expenditure types was presented. The second part consisted in analyzing whether the municipalities' development level affects the investment level. In order for the development gap to be effectively narrowed, investments implemented by municipalities at higher development levels should be considerably larger. Therefore, a synthetic development measure was calculated for variables based on 2007 data. Then, the analysis of variance was performed to check the significance of differences in cumulative investment expenditure incurred over the 2007-2016 period.

The synthetic feature was developed based on the phased method proposed by Wysocki & Lira (2005). First, the simple characteristics which co-determine the complex process under consideration were selected based on substantive and statistical grounds (analysis of diagonal entries of inverse correlation matrix R). Two criteria were used in the statistical verification: the explanatory and discriminatory power of variables. The characteristics, selected based on the extensive set of relevant literature, e.g. Strahl (2006), were confirmed to be useful by Standar & Puślecki (2011). They match the key determinants of development, such as human capital, entrepreneurship, infrastructure and financial condition of municipalities. The following characteristics were used:

- unemployed per 1,000 working-age population,
- operators of the national economy entered to the REGON register per 100 working-age population,
- synthetic measure of infrastructural development (share of population served by sewage treatment plants in the total population [%], water supply network length in km per 100 sq. km, sewage network length in km per 100 sq. km, length of hard-surfaced municipal roads in km per 100 sq. km),
- number of secondary school pupils per 1,000 population aged 16-19,
- municipality's own incomes (PLN per capita),
- municipality's investment expenditure (PLN per capita).

Afterwards, the values of simple characteristics were normalized, and the values of the synthetic characteristic were calculated. The Hellwig's development pattern (1968) was used to create the synthetic indicator. It consists in calculating the Euclidean distances between specific entities and the model unit with reference values of simple characteristics under consideration. Having calculated the synthetic measure, its arithmetic mean and standard deviation were used to arrange the municipalities and group them as follows:

- group 1 (high level),
- group 2 (medium-high level): $\bar{q} + s_q > q_i \geq \bar{q}$
- group 3 (medium-low level): $\bar{q} > q_i \geq \bar{q} - s_q$
- group 4 (low level): $q_i < \bar{q} - s_q$

with $\bar{q}$: arithmetic mean of the indicator; s_q: standard deviation (Strahl 2006). The greater the value of the indicator, the higher is the development level of the municipality. As a consequence, the closer a municipality's result is to 0, the lower the development level; conversely, values closer to 1 were characteristic of municipalities demonstrating relatively higher socio-economic development levels. Afterwards, the relationship between the development level and investment amounts was verified with the analysis of variance.

In the third part, a multiple regression model was created to explain the financial determinants of investment levels. The expenditure level per capita was set as the explained variable (Y). Explanatory (independent) variables were selected based on substantive and statistical grounds. After a literature review and a statistical verification, the following was selected:

- share of own incomes in total incomes (%);
- share of operating surplus in total incomes (%);
- the "self-financing ratio": share of operating surplus and property incomes in property expenditure (%);
- current transfers per capita (PLN);
- share of total liabilities in total incomes (%);
- share of debt-servicing costs in total incomes (%);
- share of liabilities due in total liabilities (%);
- total EU funds accessed per capita (PLN).

The selected indicators are recommended by the Ministry of Finance to be used in assessing the financial condition of local government units, and are relevant to the following areas: financial autonomy; investment opportunities; financial liquidity; indebtedness; and activity in accessing external funds. These factors were covered by the research on the financial condition by Bieniasz et al. (2013) and Dylewski (2004; 2010). The Least Squares Method was used to find the estimators. The statistical significance of the whole model was verified with the F test. The t test was used to check the significance of the model's parameters. Because of different measurement units, the values of regression coefficients were not interpreted. However, beta coefficients (normalized parameters of the regression equation) were introduced (Stanisz, 2007, p. 43-45 and 101). The adjusted coefficient of determination was used to assess how well the outcomes are replicated by the model. Also, following the interpretation of the results of this study, values representing the variation of a variable explained by other variables (Stanisz, 2007, p. 77) were also taken into consideration.

The data was arranged in tables and mapped to a box-plot. Source materials were retrieved from the Local Data Bank of the Central Statistical Office and from the database of the Ministry of Finance (*Wskaźniki do oceny sytuacji finansowej jednostki samorządu terytorialnego* [Indexes for the assessment of local government units' financial standing]).

3 Results and Discussion

3.1 Scale and structure of investment expenditure in municipalities covered by this study

In the period under consideration (2007-2016), the rural municipalities covered by this analysis invested a total of PLN 5.5 billion. The largest investments took place in 2010-2011, with annual amounts of ca. PLN 700 million, i.e. PLN 673 per capita (and a median of PLN 694). From 2007 to 2011, a 146% increase in investment expenditure was recorded. Afterwards, investment processes decelerated, reaching PLN 344 in 2016, which means a reduction by as much as one half. The reason for the intensification of investment projects was probably the inflow of EU funds as part of the 2007-2013 perspective and the fact that most of that amount was actually disbursed in 2010-2011 (Standar, 2013) (Table 1).

Also note that the increase in investment expenditure was accompanied by a reduction in disparities. In 2007, the coefficient of variation was as high as 125% (which means extreme variation). Afterwards, it went down to 57% (medium variation) and increased slightly in the last period. The decrease in disparities is also reflected by the narrowing range. This is because the municipalities which had previously reported low investment levels have recently increased their investment expenditure. Conversely, those who had invested large amounts now have considerably decreased their investment levels (Table 1). This means that the reduced dispersion of investment expenditure is not related to a general increase in investment amounts but rather to the deceleration of the investment process by the leading investors.

Table 1 **Selected descriptive statistics of the level of per capita investment expenditure in rural municipalities of the Wiekopolskie voivodeship**

Year	Mean	Median	Min	Max	Coefficient of variation	Lower quartile	Upper quartile	Range
2007	365.64	281.86	9.74	4258.48	125.63	159.18	395.81	4248.74
2008	443.25	364.33	45.65	2652.90	89.12	237.75	497.10	2607.25
2009	541.09	488.06	41.05	2394.86	63.18	319.88	648.93	2353.81
2010	757.65	673.25	36.85	2564.00	56.55	469.94	970.80	2527.15
2011	794.34	694.36	27.86	3391.90	71.93	404.12	949.39	3364.04
2012	535.15	477.36	32.28	2654.92	69.57	280.27	699.53	2622.64

Year	Mean	Median	Min	Max	Coefficient of variation	Lower quartile	Upper quartile	Range
2013	487.67	393.21	63.81	1594.52	61.66	298.85	627.02	1530.71
2014	527.71	500.06	85.11	3186.79	66.92	323.28	651.51	3101.67
2015	447.94	374.99	88.09	1523.19	62.88	261.13	531.04	1435.09
2016	429.45	343.61	103.95	1696.00	65.36	226.31	504.20	1592.05

Source: Own study based on the Local Data Bank of the Central Statistical Office.

In rural municipalities of the Wielkopolskie voivodeship, the largest amounts were allocated to infrastructural investments. Figure 2 shows the levels of selected investment expenditure in the rural municipalities covered by this study, grouped in line with the Polish Classification of Economic Activity. The funds were primarily allocated to transport and telecommunications, with a share ranging from 17% to 46% over the years. The development of the transport infrastructure, especially including the roads, is a crucial problem for Poland which suffers from an underdeveloped, poor-quality road network. The implementation of fundamental changes in that area has already begun, and is mainly related to Union funds accessed (Broniszewska, 2013). The expenditure on education and upbringing was considerably lower, ranging from 6% to 18%, and was usually allocated to the construction and upgrade of schools. The third investment target was the environmental protection and utilities, representing 7% of investment expenditure, on average. This is related to large discrepancies in development levels between the water supply network and the sewerage network (Standar & Bartkowiak-Bakun, 2014). Note that the increase in investment expenditure in 2010-2011 was related to a particularly significant growth in transport and communications expenditure.

Figure 1 **Levels of selected municipal investment expenditures in the Wielkopolskie voivodeship (PLN million)**
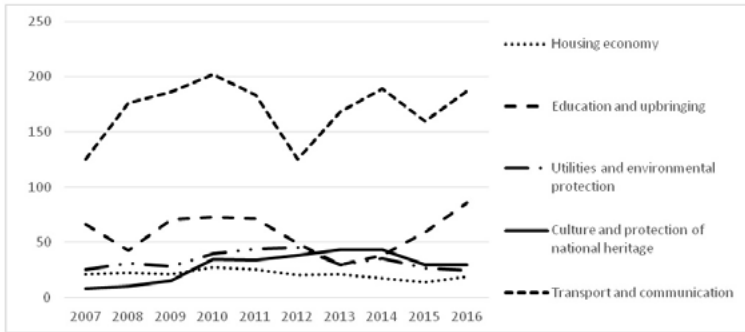
Source: Own study based on the Local Data Bank of the Central Statistical Office.

3.2 The municipalities' investment expenditure and development level

The development levels will converge if the local government units at lower development levels intensify their investment efforts. If they fail to accelerate the changes while the most developed municipalities increase their investments, they will face stagnation or even growth in disparities. Note that supporting changes in lagging regions is the first objective of the European Union's cohesion policy and a priority for the Polish domestic policy.

Figure 2 **Categorized box-plot for average cumulative investment expenditures per capita by development levels of rural municipalities of the Wielkopolskie voivodeship**
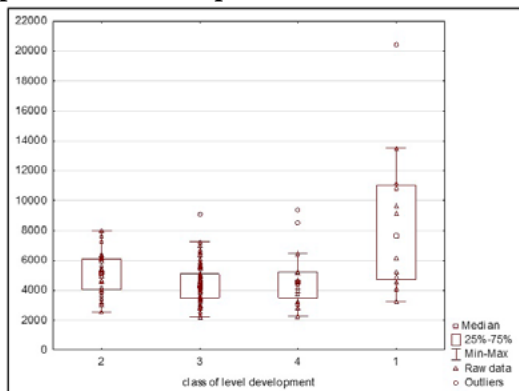
Source: Own study.

The box-plot (Figure 3) shows the average cumulative investment expenditure per capita by development levels of municipalities covered by this study. Over the 2007-2016 period, in the municipalities at high development levels (group 1), the average investment amount was PLN 8,600, compared to around PLN 5,100 in group 2. The amounts of investments recorded in other municipalities (demonstrating medium-low and low development levels) were below PLN 5,000. The significance of differences between the results of group 1 and those of other groups was confirmed by the Kruskal-Wallis ANOVA (KW) nonparametric test, resulting in F=12.96 at p=0.00. On that basis, it may be concluded that no convergence processes were observed in the rural municipalities covered by this analysis. On the contrary, they were found to diverge progressively. What also needs to be emphasized is that the group of municipalities at high development levels turned out to be the most diversified of all groups considered.

3.3 Financial determinants of differences in investment expenditure levels

In the next stage of the research, the regression function was determined with the use of STATISTICA 13.1. The method employed for that purpose was stepwise regression which consists in adding only those variables (predictors) that significantly predict the dependent variable. Therefore, as shown by the regression equation, the investment levels were affected by five factors (Table 2) in the study period. The growth of investments was driven by the increase in operating

surplus and own incomes. Also contributing were the EU funds accessed, and the decrease in self-sufficiency (liquidity) and indebtedness levels. The operating surplus per capita (beta = 0.43) and own incomes per capita (beta = 0.41) were found to have the relatively strongest impact on the explained variable.

The operating surplus means the difference between current incomes and current expenditure. It reflects the municipality's financial standing (Ministry of Finance, 2011) and indebtedness (Article 243 of the Public Finance Act). Therefore, the presence of this variable in the regression equation seems obvious. The current operating surplus may be allocated to investments or debt repayment. In turn, own incomes reflect the municipality's financial self-sufficiency and independence from the state budget. Undoubtedly, increasing the municipality's own potential also contributes to improving the investment capacity. In Poland, sources of own income include: local taxes and fees (agricultural tax, forestry tax, property tax etc.), shares in personal and corporate income taxes, and other capital and property incomes (e.g. sales tax, lease tax). The contribution of EU funds was found to be slightly smaller. This is because the implementation of investments co-financed by the EU requires the use of the municipality's own capital which is only partially refundable. It has a restrictive effect on the investment capacity, especially when it comes to *less wealthy* municipalities.

Table 1 **Summary of the regression of the "investment expenditure per capita" dependent variable (PLN)**

Indicator	BETA	BETA standard error	t	Standard error	t	p
Intercept term			235,28	67,28	3,50	0,00
Operating surplus per capita (PLN)	0.43	0.09	0.61	0.12	4.95	0.00
"Self-financing ratio": share of operating surplus and property incomes in property expenditure (%)	-0.22	0.06	-135.63	35.95	-3.77	0.00
Own income per capita	0.41	0.09	0.14	0.03	4.42	0.00
Share of EU funds in total incomes (%)	0.16	0.06	19.59	7.58	2.58	0.01
Share of total liabilities in total incomes (%)	-0.14	0.07	-250.72	119.93	-2.09	0.04

Source: Own calculations based on the Ministry of Finance Database and the Local Data Bank of the Central Statistical Office.

Meanwhile, self-financing and indebtedness levels have a negative effect on investment amounts. *Overinvestment*, difficulties in estimating the time and amount of return on investments, and increased ongoing maintenance expenses related to the investment are factors that may have a destabilizing effect on financial liquidity. In turn, a high indebtedness rate decreases the financial capacity by restricting the municipality's own incomes (because of required debt repayment and debt servicing costs). Also, it hinders access to repayable instruments because of low creditworthiness. Note that the process covered by the analysis was explained well by the model, as the adjusted coefficient of determination was 62%. This means the investment growth potential is largely explained by the factors addressed by this analysis.

4   Conclusion

The main purpose of this paper is to assess the scale of and financial reasons behind differences in the local government units' investment expenditures in the context of reducing disparities in socio-economic development. The following may be concluded based on this study:

1. There were fluctuations in the levels of investments implemented by rural municipalities of the Wielkopolskie voivodeship over the study period. Following the initial growth (until 2011), funds allocated to investment projects decreased to a level comparable to that recorded in the first year of this analysis. Also, investment amounts were highly diversified. The disparities were reduced through the intensified efforts of municipalities who had previously allocated small amounts of funds to investments.

2. The differences in the cumulated values of investments proved to be statistically significant considering the development levels of local government units under consideration. The higher the development level of municipalities, the larger was the amount of investments implemented in 2007-2016. On that basis, it may be concluded that no convergence processes were observed in the rural municipalities covered by this analysis. On the contrary, they were found to diverge progressively. Note that supporting changes in lagging regions is the first objective of the European Union's cohesion policy and a priority for the Polish domestic policy.

3. Undoubtedly, the level of investment expenditure was positively impacted by the municipality's own potential expressed as the level of own incomes and the operating surplus. These are the two characteristics with the greatest impact on the level of investments realized, as evidenced by the beta factor. Funds accessed under the EU's cohesion policy play a less significant role. Conversely,

financial liquidity and indebtedness were found to be significant factors with a negative effect. Considering the strength of impact of factors included in the regression equation, the beneficiary's own potential is the key driver of investment capacities. Therefore, it should be at the core of measures taken by municipal authorities who intend to intensify their investment projects in the future.

Acknowledgements

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SUBSIDIES AS FACTOR OF PERFORMANCE IN AGRICULTURAL ENTITIES

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Abstract

The subsidies represent part of the public finances, which are related to the existence and operation of the public sector and public administration, which falls within the tertiary sector. The common agricultural policy with its subsidy policy caused that to the agricultural subsidies flow significant and increasing proportion of the funds from the public finances. The aim of this paper is to evaluate the development of volume of subsidies provided to the agricultural enterprises in Slovakia in the context of improve their productivity. At the regional level, there was no statistically significant linear correlation between the monitored variables for the whole period under review.

Keywords: *Common Agricultural Policy, productivity, performance, agricultural enterprises*

JEL classification: *H20, Q18, G30.*

1 Introduction

When analyzing the EU's Common Agricultural Policy, we can concentrate on more effects. The effects of domestic nature can include gains and losses to producers, consumers and taxpayers, employment effects, effects on other sectors and deadweight costs to the economy as whole. The effects of an international character include effects affecting world commodity prices or the volume and structure of international trade in the agricultural sector. Although the structure of the EU Common Agricultural Policy is quite difficult, for most of the production is an

essential way of its realization through financial support. This is achieved through instruments such as different types of subsidies, intervention purchases, export restitutions, minimum import prices and import charges.

The subsidy is a form of government support extended to an economic sector, generally with the aim of promoting an activity that the government considers beneficial to the economy overall and to society at large. There are other definitions, more technical. For example, the subsidies represent some public expenditures, by means of which the production of sources such as energy or water is cheaper than its full economic cost, or which create the products, especially food or education cheaper for consumers. The subsidy may be supplied in the form of monetary payments or other transfer or through relief of an opportunity cost (Meyers and Kent 2001). The subsidies can be defined in a broader as well as in a narrower sense. The conventional form is the definition of subsidies in the narrow sense. The definition of subsidies in the broad sense is applied when costs of the activity do not arise directly from the source of a specific activity but they are influenced by other agent that may have a direct and clearly benefit from such activity (Templet 1995).

The subsidies represent part of the public finances, which are related to the existence and operation of the public sector and public administration, which falls within the tertiary sector. The common agricultural policy with its subsidy policy caused that to the agricultural subsidies flow significant and increasing proportion of the funds from the public finances.

The agricultural subsidies are an essential aspect of agriculture and play an important role in international trade. They are considered the most effective mechanism for accelerating the growth of the agricultural sector. They are paid to farmers and agribusiness operators to supplement their income in order to management of offer of agricultural commodities or influence of the cost and supply of these commodities in the international markets (Swain 2009). The main argument for the granting of these subsidies is the fact that the domestic farmers were not able to compete with foreign import without mentioned financial support of state. The removal of subsidies would contribute to increase the income disparities between rural and urban areas, and that would lead to exit of domestic farmers from the industry. The loss of domestic agricultural sector is considered as undesirable fact for various reasons, including the increase in unemployment and the loss of traditional way of life. In addition, a country that is not self-sufficient in food production can be more vulnerable to commercial pressure and the global food crisis (Henningsen, Kumbhakar and Lien 2009).

Subsidies may have a positive as well as a negative impact on the behavior of agricultural subjects. On the one hand, they can positively influence agricultural

behavior through the effect of wealth. Farmers can more readily expand production through such activities, that in the case of absence of guaranteed income from direct payments are considered too risky (Matthews 2017).

On the other hand, the subsidies may adversely affect the agricultural productivity because they distort the production structures of beneficiary farms. An illustrative example is coupled subsidies that maintain the position of farmers dealing with the loss-making area of business only in order to draw the subsidies. Subsidies may lead to technical inefficiency or lack of effort to seek farmers' cost-cutting methods. They can also cause moderate budget constraints, which means that farmers may be inclined to invest excessively and thus to use resources inefficiently. More generally, subsidies help to maintain existing resources and direct resources for more productive use in response to new technologies or changing market conditions.

In 2005, in the first year after accession of SR to the EU and after the start of realization of the rules of the Common agricultural policy in Slovakia, the volume of subsidies per ha of agricultural land amounted € 191.34. The growing trend was recorded till 2010, when this value at an average amounted € 353.88. This was the highest number of subsidies granted per ha of agricultural land during the whole period, because the year 2010 was the year when the responses of the global financial crisis culminated and the agricultural sector reached the negative economic results. The reason for this, the downward trend of yields has become, caused by the lower production, which was replaced by the increasing imports. However, a significant share on the yields of the agricultural enterprises reached just supports from EU sources. Without these supports, the agriculture would be even more unprofitable. The support has become a motivating factor and financial stabilizer of the agricultural enterprises (MARD SR 2011).

Evaluation of the production performance and effectiveness of agriculture is quite complicated, not only due to the instability of climatic conditions but also due to the wide variety of households in view of their economic strength and production profile. The effect of these subsidies on the agricultural production is a major theme in agricultural economy for several decades (Nowak, Kijek and Domanska 2015). The impact of subsidies on agricultural production, input allocation and income distribution is well documented in the literature (Rizov, Pokrivcak and Ciaian 2013). On the other hand significantly less attention has been devoted to the impact of subsidies on the productivity of farms. Most previous studies analyzed either the effects of subsidies and other factors on productivity (Guan and Oude Lansink 2006; Bezlepkina and Oude Lansink 2006; Skuras et al. 2006; Kravcakova Vozarova and Kotulic 2015; Kravcakova Vozarova and Kotulic 2016) or the efficiency of agriculture (Piesse and Thirtle 2000; Giannakas

et al. 2001; Karagiannis and Sarris 2005; Hadley 2006, Kleinhanß et al. 2007; Faze-kasova et al. 2014; Adamisin and Vavrek 2015; Kotulic et al. 2015; Mura et al. 2015; Simo, Mura and Buleca 2016; Andrejovska, Buleca and Hudakova 2016).

2   Data and Methods

The aim of this paper is to evaluate the development of volume of subsidies provided to the agricultural enterprises in Slovakia in the context of improve their productivity.

The basis for the empirical part were secondary financial and additional data of agrarian enterprises provided by the Ministry of Agriculture and Rural Development of the Slovak Republic in the form of Information sheets that we received from the company Radela Ltd. In terms of time series analysis, the paper is focused on the period from 2005 to 2014.

The following table 1 shows the representation of the agricultural enterprises in the research sample.

Table 1 **Total representation of agricultural enterprises in the research sample, 2005-2014**

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Enterprises	1410	1364	1364	1317	1383	1305	1412	1480	1483	1487

Source: Own processing.

Performance of the enterprises was evaluated by multicriterial analysis of variant, namely through TOPSIS technique. As a criterion of analysis were selected ratios of financial analysis: return on total assets, return on sales, quick ratio, payables turnover ratio, coefficient of self-financing and interest coverage. These indicators were given the same weight. The calculation of TOPSIS technique is realized by Vavrek, Kotulic and Adamisin (2015); Kravcakova Vozarova, Kotulic and Vavrek (2016); Vavrek, Adamisin and Kotulic (2017).

Performance of farms has been evaluated in the context of territorial division of the individual regions of the Slovak Republic (BA – Bratislava region, TT – Tr-nava region, TN – Trencin region, NT – Nitra region, ZA – Zilina region, BB – Banska Bystrica region, PO – Presov region, KE – Kosice region). In our analysis, we were interested in whether there is a statistically significant correlation between the performance of enterprises in the agricultural sector and the subsidies they draw on.

3   Results and Discussion

In order to the Common Agricultural Policy to respond to new challenges, it is necessary to carry out reliable measurements and assessments of the development of the European agricultural economy. The impact of agricultural subsidies on business performance is a matter of interest to policy makers, but on the other hand economic theory provides relatively little theoretical knowledge about this relationship. Due to the lack of sufficient attention in agrarian practice on the issue of agricultural performance according to territorial division, our economic analysis has focused on this area of research.

For the comprehensive assessment of performance of agricultural enterprises, we can consider that it important to evaluate the period as whole, including tracking development trends. When comparing the agricultural enterprises in individual regions, based on figure1, we can state that:

a) the best average ranking over the 10 years was recorded by agricultural enterprises in the Presov region,

b) the worst average ranking over the 10 years was recorded by agricultural enterprises in the Trencin region,

c) the relative differences in the average ranking of the regions were from 2.7% (KE - NT) to 28.84% (NT - ZA).

Figure 1 **Average ranking of regions based on TOPSIS techniques, 2005 - 2014**
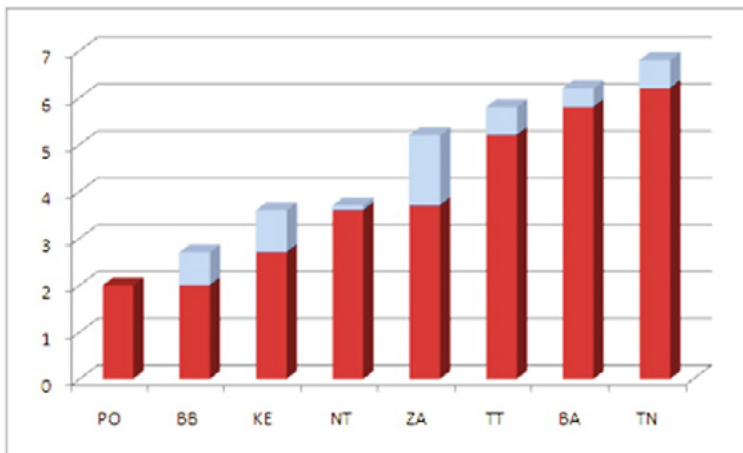
Source: Own processing.

The result of each annual evaluation is the relative distance to PIS alternative, whose distribution was tested by Shapiro-Wilk test for comparison purposes. As already was indicated in Figure 1, agricultural enterprises in the Presov region were 7 times (from 10 years) placed first. In the last 3 years, they have been replaced by companies of Nitra region, whose results were previously more heterogeneous.

Looking closer to the volume of subsidies granted per hectare of agricultural land in terms of territorial divison, we can see in each region in Slovakia a trend that is copying development throughout the Slovak Republic. In 2010, there was reached the highest value of the volume of grants in all regions except the Zilina region. Since 2010 there was a gradual decline in funding, mainly due to the depletion of funds from the Rural Development Program 2007-2013 and slower initial use of payments from the new Rural Development Program 2014 -2020 as well as a slight decrease in support from the SR budget.

The analysis showed that the lowest volume of subsidies per hectare of agricultural land was achieved by companies of Nitra, Bratislava and Trnava regions, on the other hand, the most subsidies on ha of agricultural land were received by companies in Zilina, Presov and Trencin region. It follows from that, agricultural enterprises in regions with worse natural-climatic conditions received more financial support than enterprises in regions where agricultural production has better conditions and long-term tradition.

A separate part of the analysis presents the results of dependencies of farms by volume of subsidies recalculated per hectare of agricultural land under LPIS (Land Parcel Identification System) in different regions in the monitored period. There were not confirmed any statistically significant linear correlation between monitored variables at the level of individual regions for the entire monitored period. These results are documented in Table 2. The analysis confirmed that there is no statistically significant dependence between the volume of subsidies and the performance of agricultural holdings in individual regions in Slovakia.

Table 2 **Correlations of subsidies with the results of TOPSIS technique according to territorial division, 2005 - 2014**

Regions	BA	TT	TN	NT	ZA	BB	PO	KE
Correlation TOPSIS – SUBSIDIES	0,505 (,1407)	-0,361 (,305)	0,107 (,767)	-0,266 (,457)	0,331 (,350)	0,447 (,195)	0,155* (,532)	-0,599 (,066)

Source: Own processing; *Kendall coefficient.*

4   Conclusion

On behalf of the increase of competitiveness of the agrarian production in Slovakia, there should be created a pressure on the economic rationality that would be displayed mainly in the economy and effectiveness of the recovery of resources. The system of subsidies, duties and intervention buying was established in the conviction of individual governments that the market of agricultural products would collapse and people would starve. The conviction against of the radical liberation is contributed by the fact that Slovakia could be affected by the loss of the food security, a greater burden on the environment and the change in the character of the current countryside (Adamisin, Kotulic and Kravcakova Vozarova 2017; Adamisin et al. 2015; Kotulic and Dubravska 2015). Thus, the support system (subsidies, duties, budget) will probably fulfill the necessary and basic role in the stabilizing of this industry in the future not only in Slovakia. Based on this, it is possible to assume that problems in the agrarian sector would be continually repeated contrary to the fact that the agriculture has excellent preconditions for an effective function without massive state interventions and without non-systematic market regulations.

Acknowledgements

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FINANCIAL SELF-SUFFICIENCY OF RURAL COMMUNES IN POLAND

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Abstract

The main objective of the study was a synthetic evaluation of financial self-sufficiency of Polish rural communes in 2016 based on partial indicators of the communes' financial self-sufficiency published by the Ministry of Finance and the Central Statistical Office. The communes were first classified according to a constructed synthetic index of financial self-sufficiency. Then, internal determinants of the classes were identified that embraced demographic, social, economic and infrastructural factors. The construction of the index employed TOPSIS method with a correction of ideal values, calculated advisedly without accounting for outliers. Among the four identified classes, class I of high financial self-sufficiency encompassed 17% of rural communes in Poland, while class IV of low financial self-sufficiency 15%. The former exhibited much higher own income potential than the latter, having 2.5 times larger own revenues per capita or shares of own in total revenues. Characteristically, in class I communes the agricultural and forestry taxes constituted much smaller part of the budget than in class IV – a direct consequence of twice as smaller employment on individual farmsteads. Furthermore, entrepreneurship and demographic indicators were much higher in class I, which attested to the progressive decline of agricultural functions in favor of multifunctional development of those communes.

Keywords: *financial self-sufficiency, rural communes, TOPSIS method*

JEL classification: *C38, H71, H72*

1   Introduction

The lower local administrative unit in Poland is a commune, which is responsible for the satisfaction of basic needs of its community, such as public health, safety and social care, but which can also promote harmonious development and attractiveness of the region for its inhabitants and prospective investors alike (Jastrzębska, 2004, Heller, Farelnik, 2013, Głowicka-Wołoszyn, Wysocki, 2014). The commune possesses legal personality with strictly defined rights and a base of potential income sources (Pratchett, 2004, Surówka, 2018). The empowerment of commune's government rests most crucially on its autonomy[5] in financial management, which entails, among other prerogatives, its right to raise income. Financial self-sufficiency of a commune can be then viewed as its authority to freely decide not only on income acquisition (autonomy of income), but also on the size and direction of expenditures (autonomy of spending), and on planning and execution of the commune's budget (budget autonomy) (Surówka, 2013, Surówka, 2018, Patrzałek, 2010, Kosek-Wojnar, 2006, Feret, 2013, Kotarba & Kołomycew, 2014, Wyszkowska & Wyszkowski, 2015, Oulasvirta & Turała, 2009).

Financial self-sufficiency is then a complex and multidimensional concept, though most often it is proxied by such financial indicators as own-revenues-per-capita or share-of-own-in-total-revenues (Heller, 2006, Zawora, 2010, Dziekanski, 2016). The high level of communes' own income gives them discretionary power to dispose of their assets and to carry out a wider range of own tasks tailored to inhabitants' needs, which in turn promotes a more steady development.

In Poland, rural communes show much lower financial self-sufficiency in comparison to other administrative types (i.e. urban or mixed urban-rural communes), but at the same time exhibit much higher disparities among themselves (Kozera et al., 2016). Legislative solutions allow the communes only specific sources of income regardless of their type or economic situation. With universally applied rigid tax rates, own income can vary substantially from one commune to another due for example, to their demographic potential (Sedmihradská & Bakos, 2016; Buettner, 2003).

Financial self-sufficiency of these communes is important in that it determines their sustainable social and economic growth and translates into living standards of their inhabitants (Zafira-Gomez et al., 2009; Stoilova & Patonov, 2012). It also

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[5]   ncial self-sufficiency fits into a broader concept of local government's autonomy (Kornberger--Sokołowska, 2001), which may be considered in legal, political, economic, organizational and financial terms (Heller, Farelnik, 2013, Zawora, 2010).

affects multifunctional development of rural areas, which is one of the objectives of EU regional policies.

The main objective of the study was synthetic evaluation of financial self-sufficiency of Polish rural communes in 2016 based on partial indicators of the communes' financial self-sufficiency published by the Ministry of Finance and the Central Statistical Office. Obtained results were used to construct a typological classification of rural communes according to their level of financial self-sufficiency and subsequently to identify internal determinants of its classes.

2   Data and Methods

The study included 1559 rural communes, which in 2016 represented 63% of all communes in Poland and drew on data published by the Central Statistical Office (CSO) in Local Data Bank (LDB/Public Finance) and by the Ministry of Finance (MoF) (Wskaźniki…, 2017).

Evaluation of financial self-sufficiency of Polish rural communes was conducted in two stages. The first stage began by selecting partial indicators, necessary to describe such a complex phenomenon as financial self-sufficiency. The process followed guidelines from the existing literature and resulted in a tentatively adopted set of these indicators, presented in Table 1. Then, their values were used to profile self-sufficiency of Polish communes in 2016.

The analysis of individual financial indicators allows for one-dimensional profiling of the examined phenomenon, but may pose a problem in formulating general conclusions. Therefore, in the second stage of the study, a synthetic evaluation of financial self-sufficiency of rural communes in Poland was carried out using the TOPSIS method (Hwang, Yoon 1981), used for linear ordering of investigated objects by the values of a synthetic index aggregated from partial indicators. Construction of the synthetic index of financial self-sufficiency proceeded in the following steps (Wysocki, 2010):

Step 1. The set of potential diagnostic features formed by the partial indicators from Table 1, and substantiated by extensive research, was now filtered by statistical criteria: discriminatory capacity and informative potential. Discriminatory capacity of a feature is directly its variability over the set of studied objects, while informative potential depends on the degree of its correlation with other features. Examining the coefficient of variation of the indicators, and diagonal elements of the inverse matrix of correlation coefficients, produced a definitive set of diagnostic features. Eight features passed the statistical criteria (WBF, WFIP and WWMM did not), of which all were considered stimulants of financial self-sufficiency except WDTM (destimulant).

Table 1 **Partial indicators of communes' financial self-sufficiency**

Name	Code	Formula
Own revenues per capita (PLN/person)	WDWM	$WDWM = \frac{DW}{LM}$
Index of financial self-sufficiency, 1st degree (share of own in total revenues) (%)	$WSFW_1$	$WSFW_1 = \frac{DW}{DO} \cdot 100$
Fiscal wealth index (PLN/person)	WBF	$WBF = \frac{DP}{LM}$
Fiscal autonomy index (%)	WAP	$WAP = \frac{DP}{DB} \cdot 100$
Operational surplus per capita (PLN/person)	WNOM	$WNOM = \frac{NO}{LM}$
Operational surplus in total income ratio (%)	WNODO	$WNODO = \frac{NO}{DO} \cdot 100$
Self-financing index (%)	WSF	$WS = \frac{NO + DM}{WM}$
Transfers per capita (PLN/person)	WDTM	$WDTM = \frac{DT}{LM}$
State intervention ratio (%)	WFIP	$WFIP = \frac{DT}{DO} \cdot 100$
Property expenditures per capita (PLN/person)	WWMM	$WWMM = \frac{WM}{LM}$
Financial attractiveness index (%)	WWMWO	$WWMM = \frac{WM}{WO} \cdot 100$

Symbols: DB – current revenues, DM –property revenues, DO – total revenues, DP – tax revenues (sum of all taxes and duties), DT – transfers from central budget (general and targeted subsidies), DW – own revenues, LM – commune's population, NO – operating surplus, SO- general subsidies, WM – property expenditures, WO – total expenditures.
Source: Own elaboration based on: Dylewski et al. (2006), Heller (2006), Wang et al. (2007), Zawora (2010), Heller, Farelnik (2013), Głowicka-Wołoszyn, Wysocki (2014), Kozera et al. (2016), Głowicka-Wołoszyn (2017).

Step 2. Diagnostic features were then normalized: the single destimulant was transformed into a stimulant and comparability of values was achieved by zero unitarization (Kukuła, 2000) according to the following formulas:

for stimulants: $z_{ik} = \frac{x_{ik} - \min\limits_{i}\{x_{ik}\}}{\max\limits_{i}\{x_{ik}\} - \min\limits_{i}\{x_{ik}\}}$ (1)

for destimulants: $z_{ik} = \frac{\max\limits_{i}\{x_{ik}\} - x_{ik}}{\max\limits_{i}\{x_{ik}\} - \min\limits_{i}\{x_{ik}\}}$ (2)

Step 3. Positive (A$^+$) and negative (A$^-$) ideals were determined by maximum and minimum values in the set of all communes, excluding outliers:

$$A^+ = \left(\max_i(z_{i1}), \max_i(z_{i2}), \dots, \max_i(z_{iK}) = (z_1^+, z_2^+, \dots, z_K^+) \right) \ (3),$$

$$A^- = \left(\min_i(z_{i1}), \min_i(z_{i2}), \dots, \min_i(z_{iK}) = (z_1^-, z_2^-, \dots, z_K^-) \right) (4)$$

Outliers were identified separately for each diagnostic feature and omitted in the process of ideals determination (Tukey, 1977, Głowicka-Wołoszyn, Wysocki, 2018):

$$\langle Q_1 - 1{,}5 \bullet IQR; \ Q_3 + 1{,}5 \bullet IQR \rangle \ (5),$$

Q_1, Q_3 – first and third quartiles,
IQR – interquartile range;

Step 4. For each commune the distance to both the positive and negative ideal was calculated:

Step 5. The synthetic feature q was then constructed:

Step 6. Four typological classes of financial self-sufficiency of rural communes were determined using mean $\bar{q}$ and standard deviation s_q of the synthetic index:

class I (high financial self-sufficiency): $q_i \geq \bar{q} + s_q$ (9),
class II (medium high): $\bar{q} \leq q_i < \bar{q} + s_q$ (10),
class III (medium low): $\bar{q} - s_q \leq q_i < \bar{q}$ (11),
class IV (low): $q_i < \bar{q} - s_q$ (12).

3 Results and Discussion

Two of the basic indicators for assessing the financial self-sufficiency of communes are own-revenues-per-capita and share-of-own-in-total-revenues (also known as index of financial self-sufficiency, 1st degree) (cf. Heller, 2006, Zawora, 2010, Dziekański, 2016). In the analyzed group of rural communes in Poland, the first indicator varied greatly with classical coefficient of variation reaching 95%. The least affluent in terms of own-revenues-per-capita commune of Aleksandrow registered only 508 PLN, while the richest Kleszczów, located on the Belchatow lignite belt, showed 44 240 PLN, a staggering 87 times higher (Table 2). However, extremely high values of the indicator were observed only in a few communes: 75% of them did not exceed 3-times the minimum level (amounting to 1,593 PLN), and the median of own-revenues-per-capita was PLN 1,249.

Share-of-own-in-total-revenues, an indicator most often taken as a one-dimensional proxy of communes' financial self-sufficiency, was also characterized

by a great diversity. Its values were indicative of a rather unfavorable income structure of rural communes, since for 50% of them own revenues represented a share of no more than one third of total revenues, and for 75% the share was less than 41% (Table 2).

Unfavorable for rural communes was also the fact that the median transfers from the state budget was twice as high as the level of own revenues. These results confirmed the importance of transfers in the income structure of rural communes and at the same time the high degree of reliance of local government on the state budget – circumstances that are not conducive to development initiatives, multi-functional growth, or to advancement of local self-rule.

Table 2 **Descriptive statistics of partial indicators characterizing financial self-sufficiency of Polish rural communes in 2016**

Descriptive statistics	WDWM	WSFW1	WBF	WAP	WNOM	WNODO	WSF	WDTM	WFIP	WWMM	WWMWO
minimum	508	13	165	5	-3783	-19	-39	1243	5	1	0
first quartile	991	26	692	18	267	7	107	2162	59	207	6
median	1249	32	936	25	376	10	144	2531	68	337	9
third quartile	1593	41	1294	34	497	13	201	2859	74	498	13
maximum	44240	95	46761	120	15263	40	18508	4259	87	8170	41
positional coefficient of variation	24,1	24,3	32,1	32,3	30,5	29,0	32,7	13,8	11,3	43,2	40,1
mean	1450	34	1159	28	420	10	205	2520	66	404	10
standard deviation	1377	12	1408	14	470	5	596	497	12	356	6
classical coefficient of variation	95,0	35,6	121,6	50,4	111,8	47,6	290,1	19,7	18,7	88,1	59,1

Source: Own elaboration based on data from CSO (LDB) and MoF (*Wskaźniki…* 2017).

It is also worrying that the self-financing index passed the 100% mark for a vast majority of rural communes, and for the middle half of them ranged between 102% (lower quartile) and 201% (upper quartile). This means that the communes could have covered their property expenditures to a greater extent than they actually did, which with their low level of own revenues translated into little investment and subsequently into few local initiatives conducive to improvement of their inhabitants' living conditions. Moreover, for half of rural communes property expenditures in 2016 did not exceed 9%, and for 75% of them amounted to just 13% of total expenditures incurred. However, without in-depth research it is difficult to assess this situation unambiguously, as these results may also indicate the need for communes to increase their future financial capacity by boosting creditworthiness or raising own contribution in order to meet requirements for EU investment funds.

Nonetheless, investigating individual financial indicators does not provide a complete picture nor a comprehensive assessment of any complex phenomenon. It may be problematic analysing a large number of objects (communes) and at the same time many features characterising such a phenomenon as financial self-sufficiency. In this case it was found reasonable that the multidimensional evaluation of financial self-sufficiency be treated with taxonomic methods, among which the construction of a synthetic index is a popular research approach.

Table 3 presents the results of TOPSIS based classification of rural communes' synthetic evaluation of financial self-sufficiency.

Table 3 **Levels of financial self-sufficiency of rural communes in Poland – identification and median values of financial indicators**

Classes of financial self-sufficiency	I high	II medium high	III medium low	IV low	Overall
Synthetic index (q)	<0,617; 0,887>	<0,468; 0,617)	<0,318; 0,468)	<0,113; 0,318)	**<0,113; 0,887>**
Number of communes	261	433	632	233	**1559**
% communes	16,7	27,8	40,5	15,0	**100,0**
Partial indicators of financial self-sufficiency					

Classes of financial self-sufficiency		I high	II medium high	III medium low	IV low	Overall
active in q construction	WDWM	2170	1423	1088	861	**1249**
	WSFW1	53,0	38,2	28,3	21,2	**31,7**
	WAP	42,8	30,9	21,7	14,5	**24,9**
	WNOM	607	374	337	329	**376**
	WNODO	14,2	9,9	9,0	8,0	**9,7**
	WSF	126,8	134,1	152,4	164,9	**143,6**
	WDTM	1842	2263	2712	3165	**2531**
	WWMWO	15,1	9,9	7,8	6,4	**8,8**
passive	WBF	1730	1089	810	585	**936**
	WFIP	47,0	61,8	71,7	78,8	**68,3**
	WWMM	605	358	295	252	**337**
Other financial indicators – shares in own revenues						
Taxes	agricultural	2,0	6,7	9,2	7,8	**6,9**
	forestry	0,3	0,8	1,3	1,9	**1,0**
	real estate	31,4	25,3	20,7	16,9	**22,6**
	transportation	1,1	1,5	1,6	2,0	**1,5**
from financing or co-financing EU programs and projects		0,4	0,4	0,4	0,7	**0,4**

Source: Own elaboration based on data from CSO (LDB) and MoF (*Wskaźniki…* 2017).

Class I, of its highest level, was formed by 261 communes, which constituted 16.7% of all rural communes in Poland. Their own revenues showed median of more than 70% higher than the overall median, and their aggregated share in total revenues was 53% (compared to 32% for all rural communes). The economic strength of the class was also evidenced by the level of tax revenues per capita, which was approximately two times higher than for all communes, and by the high value of the fiscal autonomy index – tax revenues accounted for almost 43% of current revenues. It should also be noted that in Class I only 2.3% of communes' own revenues were generated from agricultural and forestry tax (for all rural communes this share was 7.9%), while about 1/3 from real estate tax (8.8 pp. more than for all rural communes). All these results show that Class I communes had a multifunctional rather than typically agricultural character,

a claim reinforced by the analysis of their demographic, social and economic determinants: growing number of inhabitants, 50% higher population density, 1.6 pp. lower unemployment rate, 40% more registered firms, and much lower farm employment than among all rural communes (Table 4). A more detailed description of these communes suggested they were either endowed with natural resources (such as minerals exploited by mining or attractive landscapes profiting tourism) or located in vicinity of large urban centers and reshaped in functionality during suburbanization processes. These finding are in line with the results of earlier studies by Kozera and Głowicka-Wołoszyn (2017), where clusters of high own revenues per capita were found near the largest cities or in areas of specific industrial functions (mining, tourism).

Class II of medium high level of financial self-sufficiency was formed by 27.8% of rural communes and was characterized by a slightly higher (by 14%) own revenues per capita and larger (by 6.5 pp.) share in total revenues than respective statistics for all rural communes (Table 3). It comprised communes of mixed agricultural-multifunctional character, manifested by the relative to overall values of such indicators as the number of registered firms, the number of medium sized firms with more than 50 persons, or the ratio of individual farm employees.

The most numerous Class III of medium low financial self-sufficiency was formed by 40.5% of all rural communes. The median values of own-revenues-per-capita and share-of-own-in-total-revenues were slightly lower than for all rural communes, and the share of agricultural and forestry tax revenues in own revenues was 2.6 pp. higher than that for all rural communes, which indicated their agricultural character. That character was confirmed by the value of farm employment of 55% working population, and by the relatively high percentage of farms with at least 15ha of arable area. From the financial perspective, the predominance of agricultural functions is detrimental to the financial self-sufficiency of a commune due to the low fiscal efficiency of the agricultural taxes. As the Kozera study showed (2017), despite an increase in profitability of agriculture following Poland's EU entry, a significant part of rural communes still apply lower tax rates keeping their own revenues low.

Class IV of low financial self-sufficiency (15% of all rural communes) was characterized by lower relative values of financial self-sufficiency compliant indicators and by higher relative values of the state intervention ratio (10.5 pp. above the overall figure), transfer revenues per capita (25% above), and self-financing index (20 pp. above). These were the communes with predominance of agricultural functions and low demographic and economic potential as well as low level of infrastructural development.

Table 4 **Socio-economic determinants of rural communes' financial self-sufficiency**

Classes of financial self-sufficiency	I high	II medium high	III medium low	IV low	Overall
Population density (inhabitants per square kilometer)	76,9	54,0	46,2	47,8	**51,7**
Population change (per 1000 inhabitants)	6,0	0,4	-2,5	-2,6	**-0,6**
Share of unemployed in the working age population (%)	4,5	5,6	6,9	7,0	**6,1**
Labor force ratio (per 1000)	140,8	92,0	70,2	66,1	**81,6**
Employed on individual farms (per 100 working-age inhabitants)	27,9	41,7	55,3	54,6	**46,9**
Share of large (above 15 ha) farmsteads (%)	7,4	10,1	10,3	7,4	**9,1**
Number of firms per 1,000 working age inhabitants	146,1	112,6	94,2	89,8	**103,1**
Number of firms with 50+ employees per 10,000 inhabitants	7,2	4,5	3,0	2,4	**3,9**
Difference between water supply and sewage users' ratios (pp.)	38,0	50,2	54,8	55,0	**51,6**
Ratio of gas systems users (%)	24,1	1,6	0,1	0,1	**0,5**

Source: Own elaboration based on data from CSO (LDB) and MoF (*Wskaźniki…*
2017).

4   Conclusion

The research showed that rural communes in Poland are characterized by a low
level of financial self-sufficiency and a high degree of dependence on transfer
revenues from the state budget. Only in the case of nearly 17% of rural communes with disappearing agricultural and already developed industrial and residential-service functions (due to specific natural endowments or suburbanization
processes) it is possible to speak of a high degree of financial self-sufficiency. Only
in this class of high (and partly in the class of medium high) financial self-sufficiency, favorable demographic changes such as population growth were observed.

In the case of 45% of rural communes, the level of financial self-sufficiency was assessed as medium low to low. These were communes whose income in over 70% (and in the case of low level communes in almost 80%) was financed from the state budget. They had high unemployment rates, low population density, negative changes in the number of inhabitants and small shares of expenditure on investments in local budgets. The predominance of agricultural functions in these classes could not bolster demographic or economic potential, nor support technical infrastructure improvements and consequently general local development.

The research showed that multifunctional development supports greater financial self-sufficiency of rural communes. Local governments should therefore undertake actions to foster entrepreneurship by increasing investment attractiveness of the communes. Moreover, the central government would do well to improve fiscal implementation of the agricultural tax in typically agricultural communes.

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MONITORING OF THE FINANCIAL CONDITION OF AGRICULTURAL ORGANIZATIONS IN THE VOLOGDA REGION OF RUSSIA

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Abstract

Monitoring of the financial condition of agricultural enterprises is necessary for assessing the effectiveness of state regulation of the economy and justifying the amount of state support for the agricultural sector. The article presents the results of an analysis of the financial condition of agricultural organizations in the Vologda region over a five-year period. The comprehensive financial analysis showed a positive dynamics of all groups of financial ratios, a significant improvement in the type of financial situation in agriculture of the region. Since 2014, there has been an improvement in the financial condition of the agricultural enterprises of the industry sector, which was due to the influence of active state regulation of the food market in conditions of sanctions and import substitution.

Keywords: *monitoring, financial condition, state support, agriculture, sanctions, import substitution*

JEL classification: *Q01, Q1, Q14, Q18*

1   Introduction

The improvement of the financial condition of an agricultural sector is one of the most important directions in economic development of Russia. The efficiency of all sectors of agro-industrial complex depends on the results of the activity

of agricultural organizations. During recent years a state program of agricultural development and markets regulation of agricultural products, raw materials andsupplies has been developed and is being successfully implemented in the country. Therefore, the monitoring of the financial condition of agricultural enterprises is currently important for evaluation of the efficiency of state regulation of economics and reasoning of the state support volume for an agricultural sector.

For the period from 2012 to 2016 the amount of agricultural organizations in the Vologda region reduced by 21,8 % (the Department of agriculture and food resources of the Vologda region, 2017). Failure of an enterprise is a result of a number of reasons such as market price disparity, insufficient qualification of managerial personnel, change in pricing policy, and market conjuncture, etc.

Thus, there is a need in a periodical monitoring of the financial condition of agricultural enterprises that will allow revealing "narrow" points in their activity and timely influencing the unfavorable situation through specific measures of state support and managerial decisions.

2   Data and Methods

The purpose of the study is to carry out the monitoring of the financial condition of agricultural organizations of the Vologda region and reveal the effectiveness of the measures of state support of the sector.

In accordance with the target goal the following tasks can be determinedin the study: to study the financial condition of agricultural organizations of the region; to carry out an analysis of the dynamics of volumes of state support; to find out the interrelation between the level of state support and the financial condition of agricultural organizations.

The scientific study was carried out based on the information of official bodies of state statistics, materials of the department of agriculture and food of the Vologda region, Ministry of agricultureof the Russian Federation. For achievement of the results the following methods of scientific studies were used:monographic, economic-statistical, tabular, graphical and other methods.

The financial condition of an enterprise is a complex concept which reflects presence, allocation and usage of all available financial resources (Kamsha & Kudinova, 2014). The financial situation is considered to besustainable if by unfavorable changes of external environment an organization fulfillsits obligations and at the same time it has the means to perform extended reproduction. Carrying out the monitoring of the financial condition allows revealing the main factors which influence the significant estimated figures of the financial condition

of an organization and forecasting their further dynamics (Barinova & Yureneva, 2017, October 21).

The Vologda region belongs to a number of regions of the European North of the RF which are territorially rather large and is the oldest region of dairy cattle breeding in Russia. Dairy farming as the leading sector of agriculture in the region began to form in 70-s of the XIX century. The availability of fertile pastures and the nearness of large consumer centers (Moscow, Saint-Petersburg) contributed to that.

In spite of the fact that the region is situated in the area of risk farming, it is considered to be agricultural: annually, agricultural products are produced here to the sum of 20 milliard rubles. Dairy farming is one the main branch of animal breeding in the Vologda region. The biggest relative share in revenue of agricultural enterprises in 2016 took the profit from sales of animal production - 93%, among them - 55% of milk sales (Figure 1).

Figure 1 **The structure of revenue from sales of products of agricultural enterprises in the Vologda region for the period 2014-2016**
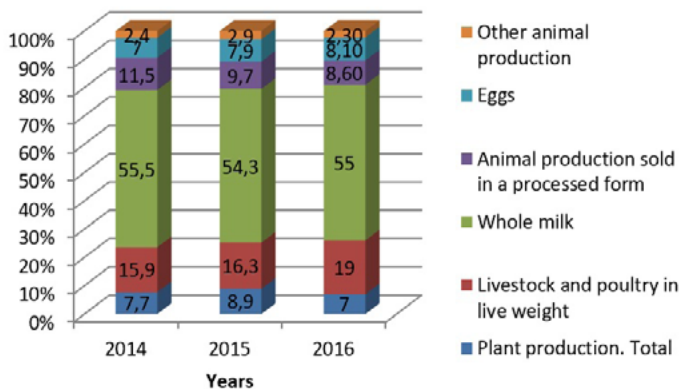
Source: Calculated by the authors using the data of the official Internet-portal Vologdastat: Statistical collected volume "The Vologda region in figures 2016" available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

The main producers of products are agricultural organizations, the share of which made 72 % of the total volume of agricultural production in the region in 2016 (Vologdastat, 2017). During the recent years tendencies of sustainable agricultural development have been outlinedin the Vologda region. The growth in production volume of gross output, revenue and profit from sales of agricultural

products of organizations takes place (Yureneva & Barinova, 2016, May 25-27). By thereduction of quantity of agricultural enterprises and number of employees, cost of gross output of an agricultural sector, labor productivity and industry profitability are growing; the share of unprofitable businesses is decreasing (Table 1).

Table 1 **The main indicators of agricultural enterprises of the Vologda region in 2012 - 2016**

Indicator	Years					The change for the period (+,-)
	2012	2013	2014	2015	2016	
Agricultural products in actual current prices, mln. RUB.	15,6	14,4	16,5	20,8	21,3	5,7
Revenues from sales, mln. RUB.	15199	14234	15062	16646	18645	3446
Cost of sales, mln. RUB.	14105	14393	15452	14636	16901	2796
Profit (loss) from sales, mln. RUB.	610,6	-639	-793	1528,6	1964	1353,4
Netprofit, mln. RUB.	-117	-3595	1808	1609,1	2129	2246
Gross milk yield, thousand tons	419,0	390,6	408,0	429,3	450,1	31,1
Labour productivity, thousand RUB	780,0	818,2	1057,7	1368,4	1439,1	659,1
The number of organizations, units.	229	213	193	179	179	-50
The share of unprofitable farms, %	37	38	25	21	19,5	-17,5
Profitability of the main activity without subsidies, %	-5,7	-34,7	2,5	2,2	5,0	10,7
Profitability of the main activity taking subsidies into account, %	-0,2	-24,4	11,9	11,3	13,0	13,2

Source: Calculated by the authors according to the Official web portal Vologdastat: a Statistical compendium "The Vologda region in figures, 2016", available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

For the period from 2012 to 2016 there is an increase of gross output and sales revenue by 36,5% and 22,7% relatively in agricultural enterprises of the region. In 2016 as compared with 2012 the final financial result of agricultural enterprises - net profit - increased by 2246 million, that characterizesthe effectiveness of enterprise performance in the sector.Profitability of main activity has an increasing

tendency both taking into account state subsidies and without regard to state support.

Figure 2 The number of profitable farms and their share in the total number of agricultural enterprises of the Vologda region in 2012-2016
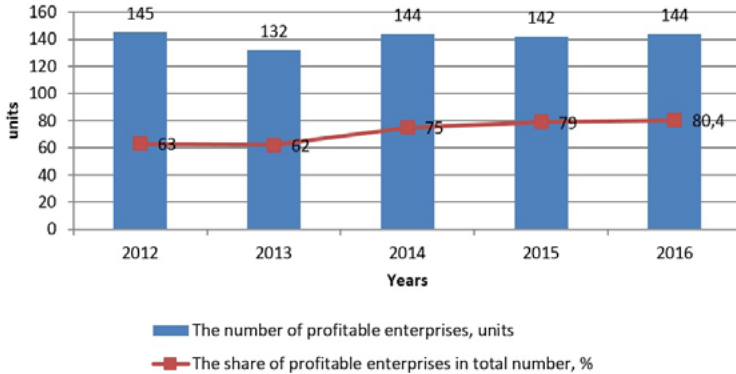
Source: Calculated by the authors according to the Official web portal Vologdastat: a Statistical compendium "The Vologda region in figures, 2016", available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

The share of profit-making organizations in the total amount of farms and the profitability level are the most important indexes characterizing the financial condition of the agricultural sector. In 2016 a relative share of profit-making farms in the total amount of agricultural enterprises made 80,4%, it was 17,4% higher than the level of 2012 (Figure 2).

The authors carried out the monitoring of the financial condition of agricultural enterprises of the sector during the period while the financial crisesand the introduction of economic sanctions were influencingtheir development. Therefore, it is necessary to take into consideration that by changing the conditions in which agriculture is, the financial situation of enterprises of the sector also will change and that will be followed by the need for development of new recommendations for the formation of efficient state support of the sector. Consideration must be given tothe fact that the results of an assessment of the financial condition of agricultural organizations are determined by sectorial peculiarities both objective and economic.

In the opinion of the Russian scientists (V.V. Kovalev, A.D. Sheremet, E.V. Negashev, R.S. Sayfulin) relevant indexes are used for the complex assessment of the financial condition. They are united in accordance with the economic sense into

three groups: paying capacity and liquidity ratios, financial sustainability ratios and business activity ratios.

The financial condition of an enterprise from the long-term perspective is estimated by the indexes of liquidity and paying capacity, which characterize in general, if an enterprise can make payments for short-term obligations timely and fully.

When speaking about the liquidity of an enterprise it is meant theavailability of circulating assets in an amount sufficient for repayment of short-term obligations. Otherwise, the liquidity is a formal excess of circulating assets over short-term obligations.

The paying capacity means that an enterprise has monetary funds and their equivalents are sufficient for credit debt settlement which requires immediate payment. V.V. Kovalev (2002) thinks that for the summary evaluation of liquidity and paying capacity of an enterprise is enough to use three main analytic ratios:

$$\text{Absolute liquidity ratio} = \frac{\text{monetary funds + short - term financial investments}}{\text{short-term obligations}} \quad (1)$$

$$\text{Quick liquidity ratio} = \frac{\text{monetary funds + short-term financial investments + debit debt}}{\text{short term obligations}} \quad (2)$$

$$\text{Current liquidity ratio} = \frac{\text{circulating assets}}{\text{short-term obligations}} \quad (3)$$

One of the features of the stability situation of an enterprise is its financial sustainability. In the classic theory of a financial accounts analysis, financial sustainability is a correlation of assets and obligations of an organization which guaranties a certain level of failure risk of an organization (Sheremet, 2018). Therefore, the ratios which characterize the structure of assets and liabilities and also a correlation between separate items of assets and liabilities can be used as the indexes of financial sustainability:

$$\text{Current assets coverage ratio by own circulating assets} = \frac{\text{own capital - fixed assets}}{\text{circulating assets}} \quad (4)$$

$$\text{Capitalization ratio} = \frac{\text{long - term credits and loans}}{\text{own capital + long - term credits and loans}} \quad (5)$$

$$\text{Independence ratio} = \frac{\text{own capital}}{\text{total sum of funding sources}} \quad (6)$$

$$\text{Ration of inventory financing by own circulating assets} = \frac{\text{own capital - fixed assets}}{\text{resources}} \quad (7)$$

The above mentioned ratios of financial sustainabilitycharacterize the independence of each element of assets of an enterprise and of property in general,

and give an opportunity to measure if a company financially strong enough. The most important index of this group is the independence ratio which says about the independence of an enterprise from borrowed assets and shows a share of own assets in the overall value of all assets of an enterprise. The higher the value of the given ratio the stronger financially, the more sustainable and independent from external creditors an enterprise is.

The indexes of business activity are the tools for evaluation of the efficiency of the main business activity. The velocity of turnover of financial recourses can be considered as the major characteristic of these indexes. In the opinion of A.D. Sheremet and E.V. Negashev (2016) the analysis of business activity consists in the study of levels and dynamics of different turnover ratios.

Ratio of correlation of sales revenue and obligations

$$= \frac{sales\ revenue}{short\text{-}term\ credits\ and\ loans + long\text{-}term\ credits\ and\ loans} \quad (8)$$

$$Turnover\ ratio\ od\ credit\ debt = \frac{sales\ revenue}{average\ of\ credit\ debt} \quad (9)$$

$$Turnover\ period\ of\ credit\ debt = \frac{360}{Turnover\ ratio\ od\ credit\ debt} \quad (10)$$

$$Turnover\ ratio\ od\ debit\ debt = \frac{sales\ revenue}{average\ of\ debit\ debt} \quad (11)$$

$$Turnover\ period\ of\ debit\ debt = \frac{360}{Turnover\ ratio\ of\ debit\ debt} \quad (12)$$

The assessment of the financial condition of agricultural organizations begins with a study of financial sustainability, liquidity, paying capacity and economic activity (Table 2).

Table 2 **Financial indicators of the financial position of agricultural enterprises in the Vologda region in 2012-2016**

Indicator	Years					The change for the period (+,-)
	2012	2013	2014	2015	2016	
paying capacity and liquidity ratios						
External liabilities, total, mln. RUB.	23620	18466	13129	9105	8818	-14802
Including loans and credits, total, thousand RUB Among them:	12095	10598	7731	4350	4226	-7869

Indicator	Years					The change for the period (+,-)
	2012	2013	2014	2015	2016	
- long-term	6732	7412	5209	2254	2071	-4661
- short-term	5363	3186	2522	2096	2155	-3208
Absolute liquidity ratio	0,08	0,23	0,28	0,37	0,16	0,08
Quick liquidity ratio	0,43	0,56	0,69	0,84	0,68	0,25
Current liquidity ratio	1,48	1,47	1,69	2,15	2,11	0,63
financial sustainability ratios						
Current assets coverage ratio by own circulating assets	-0,18	-0,33	-0,08	0,28	0,28	0,46
Capitalization ratio	1,35	1,82	1,13	0,63	0,51	-0,84
Independence ratio	0,42	0,35	0,47	0,61	0,66	0,24
Ratio of inventory financing by own circulating assets	1,24	1,29	1,67	1,93	2,19	0,95
business activity ratios						
Ratio of a correlation of sales revenue and obligations, times	0,64	0,77	1,14	1,82	2,11	1,47
Payables turnover ratio,turns	3,35	2,62	2,95	3,5	4,6	1,25
Payables turnover period, days	107	137	122	103	79	-28
Receivables turnover ratio, turns	4,28	3,99	4,48	5,12	5,41	1,13
Receivables turnover period, days	84	90	80	70	67	-17

Source: Calculated by the authors according to the Official web portal Vologdastat: a Statistical compendium "The Vologda region in figures, 2016", available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

It can be seen that the vast majority of financial indexes of agricultural organizations testifies the stabilization of the sector situation. In conditions of the economic crises enterprises couldn't afford using credits and loans as the policy of the Bank of Russia made them very expensive. Current situation led to significant reduction of external obligations of agricultural organizations,nearlytwice.

Actually, sums of credits and loans almost 63 % decreased,both long-term and short-term. Thereby, there was an increase of liquidity ratio and paying capacity, provision of working assets by own circulating assets and other indexes of the financial condition of agricultural enterprises.

Thus, absolute liquidity ratio in 2013 reached the criteria value, current liquidity ratio showed sustainable growth dynamics in 2015 also came up to the standard. Reduction of values of above showed ratios raises concerns.Essentialincrement of value can be noticed by the ratio of provision of working assets by own circulating assets. If in preceding years it had negative values, it said thatagricultural organizations lacked own circulating assets, and in 2016 the index exceeded the standard value more than twice and stayed sustainable (Barinova & Yureneva, 2017, October 21). The positive dynamics of business activity ratio tell about the increase of efficiency of the assetusage by organizations of the region.

An analysis of credit debts showed in 2016 its 14,7% decrease comparing to 2012 (Table 3).

Table 3 **The dynamics of accounts payable in agricultural enterprises of the Vologda region in 2012-2016**

Indicator	Years					The change for the period (+,-)
	2012	2013	2014	2015	2016	
Payables, total (not including credits and loans), mln. RUB.	4793	7868	5398	4755	4089	-704
Including overdue (1 Dec)	481,1	620	1619	1624,2	590,2	109,1
The share of overdue payables in the whole debt, %	10,04	7,88	29,99	34,16	14,44	4,4
Receivables, total, mln. RUB.	3546	3561,6	3359,1	3254	3448	-98
Excess of payables over receivables, times	1,35	2,21	1,61	1,46	1,19	-0,16

Source: Calculated by the authors according to the Official web portal Vologdastat: a Statistical compendium "The Vologda region in figures, 2016", available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

Excess of a turnover period ofcredit debts over debit ones confirms the fact that agricultural organizations use raised financing sources more actively than give credit to their buyers, and the period of this outsourcingis 12 days longer.

A negative moment is the decline of credit debts quality. The share of past due debt had increased from 10,04% in 2012 to 14,44% in 2016. The fact that the dynamics of credit debts excess over debit ones in 2016 was decreasing comparing to 2012 also alerts.

In the structure of credit debts a "calm" debt prevails – to suppliers and contractors, as well as to other creditors (Figure 3).

Figure 3 **The structure of accounts payable in agricultural enterprises of the Vologda region in 2012-2016**
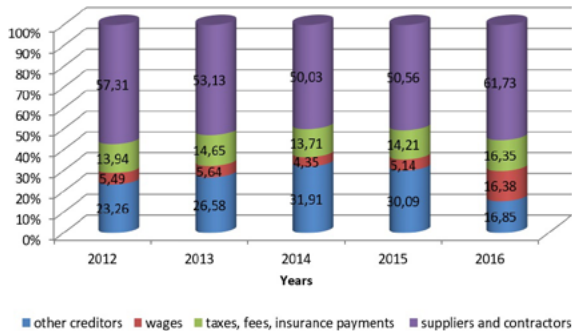
Source: Calculated by the authors according to the Official web portal Vologdastat: a Statistical compendium "The Vologda region in figures, 2016", available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

From 19,43% in 2012 to 32,73% in 2016 fall to the share of debt due, it requires negative evaluation.

3   Results and Discussion

Nowadays, there isn't any unified common methodology for studying the summary level of the financial condition of enterprises of the agricultural sector. Therefore, the focus on already used regulations, particularly, on the Federal law of the Russian Federation "About financial improvement of agricultural producers" of July 9, 2002 No. 83-FZ (as subsequently amended).

According to the methods of state administration bodies for identifying the type of financial sustainability 6 indexes are used. They characterize paying capacity of an organization from the point of view of long-term perspective. The value of each index is compared to the scale specified in the methods, and is assigned by a fixed point, then the points are summed up, the conclusion is made and an enterprise is classified according to a type of the financial condition and referred

to one group or another (The Federal law "About financial improvement of agricultural producers", 2002).

Using the methods of evaluation of the financial condition of agricultural producers approved by the Federal law, the following results of the analysis of the financial condition of agricultural organizations of the Vologda region were received from the perspective of financial sustainability (Table 4).

Table 4 **Type of financial condition of agricultural organizations in the Vologda region in 2012-2016**

Indicator	Years				
	2012	2013	2014	2015	2016
Absolute liquidity	4	8	8	12	4
Quick liquidity	3	3	3	3	3
Curren tliquidity	4,5	4,5	9	16	16,5
Funds security factor	3	3	3	6	6
Financial independence	1	1	4,4	17	17
Ratio of inventory financing by own circulating assets	13,5	13,5	13,5	13,5	13,5
Number of points	29	33	40,9	67,5	60
The group of financial stability	4	4	3	2	2

Source: Calculated by the authors according to the Official web portal Vologdastat: a Statistical compendium "The Vologda region in figures, 2016", available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

The type of financial sustainability for agricultural organizations of the Vologda region changed for the better, from the fourth group in 2012 to the third in 2014 and to the second in 2015 and 2016. This shows that the financial situation of agricultural enterprises of the Vologda region has improved. For agricultural enterprises of the second group more favorable conditions of state regulation are used, that actually influences the results of their activity.

The economic crises of 2008-2009, unfavorable weather conditionssignificantly influenced the development of agricultural enterprisesof the Vologda region. Therefore, in 2012 a regional support program of the agricultural sector was adopted in the Vologda region within a framework of the state program of agricultural development and market regulation of agricultural production, raw materials and food in Russia (the Department of agriculture and food resources of the Vologda region, 2017). An active state support on the federal and regional levels also became the factors of improvement for the financial situation of

agricultural enterprises. The enterprises were provided with the subsidies, interest rates on credits were reduced (Figure 4).

Figure 4 **The dynamics of state support in agricultural organizations of the Vologda region in 2012-2016**
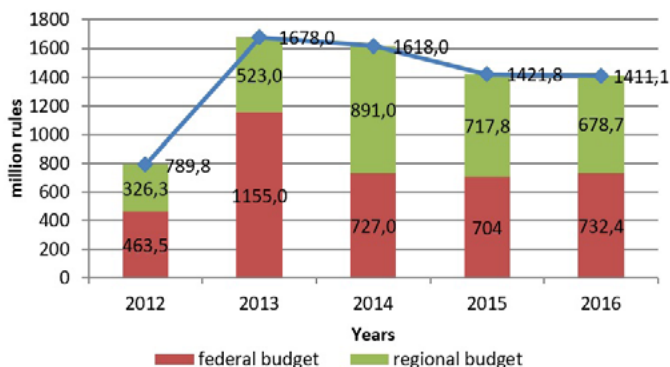
In the prior four years, 16 % decrease of the volume of budget funds directed to support of agriculture has been observed in the Vologda region (Yureneva & Barinova, 2016, May 19-20). Attention should be paid to the fact that particularly since 2014 with the food sanctionsintroduction and the necessity of import substitutionfast growth of the sector indexes has been seen. In spite of the reduction of state support, the sector indexes have the increasing tendency that is proved by the date of activity of agricultural enterprises in the Table 1. The economic sanctions became a certain impulse for the successful development of agriculture in the region and reasonable state support should strengthen the effect.

State support directly influences the results of the activity of agricultural enterprises (Table 5).

Table 5 **The influence of the state support level on the performance of agricultural organizations in the Vologda region in 2016**

Number of the group	Grouping the districts of the Vologda region according to the level of state support in reliance on 100 ha of agricultural lands, thousand rubles	Amount of enterprises, unit.	State support in reliance on 100 ha of agricultural lands, thousand rubles	Revenue in reliance on 1 employee, thousand rubles	Profitability taking into account subsidies, %
I	Less than 300,0	31	130,02	841,75	-7,9
II	301,0-700,0	106	489,73	1233,67	11,96
III	More than 700,0	42	5189,32	1529,59	26,13
x	Avarage	x	1532,40	1233,43	11,85

Source: Calculated by the authors using the data of the official Internet-portal Vologdastat: Statistical collected volume "The Vologda region in figures 2016" available at: http://volstat35.ru/bgd/cifrfakt/main.htm.

Grouping the enterprises of the Vologda region according to the level of state support in reliance on 100 ha of agricultural lands allows revealing a direct dependence between the volumes of budgetary funds sent to agricultural enterprises and performance indicators of enterprises such as revenue per an one employee and profitability taking into account subsidies.

The carried out grouping showed that the increase of the volume of budgetary costspositively influenced the condition of agriculture in the Vologda region. In 2014 by means of state subsidies the crises of 2012-2013 was managed to overcome when high credit costs and untimely state support of enterprises led to livestock reduction, decrease in production of milk and other agricultural products. In 2014 through the introduction of new kinds of state support from the regional budget – subsidies on cow population growth and on reimbursement of a part of costs for the purchase of cows by private farm holdings - cow population in the Vologda region was managed to stabilize.

4   Conclusion

The monitoring of the financial condition of agricultural enterprises in the Vologda region showed the positive dynamics of standard ratios and other analytic indexes.

The ratios of paying capacity and liquidity have the growth dynamics but at the same time the ratios of absolute and quick liquidity don't reach the standard

values. It tells about problems with repayment discipline of agricultural enterprises. The current liquidity ratio achieved the standard value in 2015. Therefore, the reduction of short-term obligations and the growth of circulating assets can be observed.

The financial sustainability ratios also have an increasing tendency, except for the capitalization ratio. The independence ratio showed by the end of 2016 that own financing sources took 66% of the sum of all sources. The value of the ratio exceeded the standard level. The reduction of the capitalization ratio speaks about the change of the obligation structure towards the increase of the size of short-term borrowed sources. The current asset coverage ratios and inventory financing by own circulating assets exceeded standard values. This fact is positively estimated and tells about sufficient volume of own capital of agricultural enterprises for financing the actual groups of assets.

The ratios of business activity are growing in dynamics; it means the increase of effectiveness of settlements. The positive moment is the decrease of turnover periods of credit and debit debts. Moreover, buyers settle accounts with the enterprises quicker than enterprises with suppliers.

As a result of the studies it is possible to say that the state measures of support of agriculture on the food market influenced the volumes of agricultural production positively.

The situation is confirmed by the calculations carried out according to the methods of state economic management authorities which take into account sectorial peculiarities of activity of agricultural enterprises. The main factors, which positively impacted the financial condition of agricultural organizations, are considered to be efficient state regulation, introduction of sanctions and development of import substitution on the food market. All indexes ofassessment of the financial condition have had the increasing tendency since 2014 (the year of introduction sanctions). In spite of the reduction of volumes of state support of the sector, the subsidies also influenced economic indexes of agriculture of the region positively, mainly through interest rate subsidies that led to significant growth of ratio of financial independence of agricultural organizations and their liquidity.

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SESSION 7

ACCOUNTING AND INFORMATION SYSTEMS

SYSTEM FOR CONTROLLING ACTIVITIES IN SLOVAK AGRICULTURAL ENTERPRISES

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Abstract

Agricultural businesses are exposed to pressure from competition and therefore are trying to seek key factors that will bring them success. In general, modern business management, use of modern information technologies and innovation are those factors that help agribusinesses to succeed in the market not only in the short-term but also in the long term. One of the tool of modern corporate management is controlling, which ensures the coordination of all business activities. Its existence in an enterprise significantly contributes to business activity management. The aim of the paper is to determine the extent to which controlling activities are used in agricultural enterprises in Slovakia. The surveyed objects are companies operating in agricultural sector. The research sample was divided by size, legal form and duration of the business activity on the market. The principal technique of data collection was a questionnaire. For evaluating results obtained from questionnaire survey statistical methods were applied.

Keywords: *agricultural enterprises, controlling, controlling activities, questionnaire survey*

JEL classification: *M21, Q19*

1   Introduction

Despite efforts for continuous improvement, it appears that the traditional management of business performance based primarily on financial management hit its limits and lately in the world are beginning to promote new non-traditional indicators, methods and models, based primarily on non-financial, strategic and often and qualitative indicators, methods and models. The secure long-term prosperity and company performance should be at least equal importance with which they dealt with the operational and financial problems (Zámečník and Rajnoha, 2015). Controlling today is an important part of the business management system (Teplická, 2011).

Continuous development forces businesses to become more transparent and to publish meaningful business information about their future prospects. Controlling as a tool for targeted collection and processing of business management information will become the key to addressing this challenge in the future and will therefore continue to gain force (Wambach and Wunderlich, 2002). Controlling is a management system that improves business efficiency and thus adaptability to change not only inside the enterprise but also outside of it. Effective implementation of controlling has a positive impact on the efficiency of business activity (Vuko and Ojvan, 2013). Operating controlling should inform the management about the changes in the businesses environment at the time and finds out impact these changes to basic economic indicators of company (Dolinayová and Ľoch, 2015).

Regardless of the fact that large, international and global companies hold a big share of the market economy, there are still segments that are inefficient for these businesses, and that is where space for smaller business entities is created. However, they must fight with constantly growing competition on the market, and therefore it is essential to operate the most effective and to save costs. This is the reason that controlling has its application also in these small and medium business units (Foltínová and Dubcová, 2010). Small and medium-sized enterprises, however, are afraid of modernization and introduction of new procedures, they simply have a fear of everything new and unknown (Bednárová, Ľ., 2008). They are concerned about innovations of applied methods and implementation of new practices that make the work more efficient (Sedliačiková, Šatanová and Foltínová, 2012).

Agricultural holdings in market economy are under extensive pressure of competition. As a result of this fact they are looking for new approaches to improve internal processes, steering them with the intention of continuously respond to emerging situations. Controlling represents significant tool for coordinating these

processes in agricultural enterprises (Pataky, 2003). In the focus of many scientific studies is an analysis of the economic performance of enterprises operating in the field of agriculture. According to these studies, not only natural conditions, concentration of agricultural land, legal form of enterprise, but also individual work of specific companies' management are among the determinants of agricultural holdings different performance and efficiency (Vozárová and Kravčáková, 2016). Controlling is not a universal system that can be applied to any agricultural business unit. Its tools will be in the future a necessary part of company management, because any agricultural enterprise can be economically successful only in combination with an efficient managerial system (Schmitt, 2009).

2   Data and Methodology

The aim of the paper is to evaluate perception of controlling in agricultural holdings in Slovakia, which activities are used and how firms perceive the position of controller in the company. The surveyed objects were agricultural enterprises operating in the Slovak Republic, which were classified in terms of size, legal form and length of the market activity. Using the individual criteria has helped us get more relevant data for processing. Another classification criterion was the position that the respondent - the representative of the business entity who answered the questions in the questionnaire - held position. We were mainly interested in medium-sized and small businesses. Micro-enterprises have been excluded from our research as we think that the examination of controlling in micro-enterprises is irrelevant, and such research would only yield insignificant results. The basic technique of data collection was a questionnaire. The questionnaire survey was conducted between December 2016 and December 2017. Return on questionnaires was more than 30%. After collecting and sorting incorrectly or incompletely filled out questionnaire forms, we have completed a sample of 150 farms, which yielded a number of relevant data. In order to increase the return of questionnaires were agricultural enterprises contacted by telephone and subsequently the questionnaire was sent. In order to make easier and more transparent results processing a questionnaire form was used in electronic form which was created using the Google form. The data obtained from the questionnaires were processed in the statistical program Xlstat. For the purpose of a deeper analysis obtained answers, a Chi-square test was used to determine the dependence between examined phenomena. For determining whether the differences found in the sample are statistically significant or they are only result of coincidence we used the Friedman test. Since we worked with a balanced experiment (there was

same number of measurements in each class), a more detailed view at the issue allowed us Nemeny's multi-comparison method.

3   Results and discussion

Respondents who answered questions were classified according to the legal form of business, according to the size criterion (number of employees - according to the recommendations of the European Commission) and length of the operation on the market. From the aspect of legal form of business have the largest representation limited liability companies which held 49% of the sample of agricultural businesses. The second most represented category were cooperatives which were involved in the selection file of 36 %. The least represented category were joint-stock companies representing 15% of the sample. The structure of the sample in terms of legal form reflects in a greater extent to the structure of agricultural holdings in Slovakia, as in recent years the number of companies especially limited liability companies, has grown and exceeded the number of cooperatives whose long-term development is characterized by a long-lasting downward trend. In the last years agricultural cooperatives internally changed to capital businesses with the majority interest of several members. The huge part of agricultural business companies was established by the transfer of creditworthy part of cooperative assets and their business activities without the transfer of liabilities towards banks and other business partners and as well as without a suitable settlement of interests of their members and shareholders (Košovská and Váryová, 2017).

Medium-sized businesses accounted for 43% of the sample and small businesses 57%. Questionnaire research participated 13% of agricultural enterprises operating on the market for less than 5 years, 36% of companies operating on the market for less than 15 years and 51% of companies hold their position on the market for more than 15 years (51%). The structure of the sample reflects the fact that agriculture has a relatively long history of activity on the market, and thus more than half of the companies that participated in the questionnaire research have their long-term market position. The majority of respondents were economists who held 53% (80 respondents). The second largest category was formed by accountants and controllers who participated in the sample of 28% (42 respondents). The least represented category were owners, directors and managers, whose share in the research sample was 19% (28 respondents).

Of the 150 respondents representing agricultural enterprises 113 respondents (75%) think that there is a difference between the concepts of control and controlling. The remaining 37 (25%) do not distinguish between these two terms. Those who answered positively should determine the difference. This question

did not answer all respondents, but those who expressed their opinion consider the relationship between controlling and control in the right sense. The majority of respondents consider that control is only part of controlling and also that controlling is broad-spectral and ranges into all areas of business management. Controlling focuses on the future and, unlike the control is not only identifying deviations but also analyse them and seeks to find corrective measures to prevent their occurrence in future. As many experts in this field also respondents of our research provided various perspectives on controlling and can say that all their presumptions were correct. Controlling is a management subsystem focused on the planning and control process, on its coordination and information support (Horváth, 2004).

Controller and manager must work very closely. Generally, controller is someone between economist, accountant and manager. While the job responsibilities of a manager are commercial activities, company and its individual departments management. The task of economists and accountants is to prepare transparent economic and accounting information. The controllers' mission is then the data processing provided by the accounting and economic departments in such a form as to make them understandable for the company's management while providing important information for making relevant decisions. Controllers are increasingly transforming to managers' consultants. The scope of their roles and requirements increases with regard to their interaction with managers (Weber and Schäffer, 2011).

Another question that we wanted to evaluate, was concerned with how controllers' representatives perceive representatives of agricultural holdings and whether they have the right ideas about him. The question was formulated as whether they think that controller's function is overlapping with the manager function. From the evaluation of questions in the questionnaire was indicated that more than 77 % of respondents (116 companies in total) think that the controller should be also a manager. Remaining almost 23 % of respondents (34 companies in total) do not think so.

In response to the question about the link between controller and manager we wanted to discover whether the position that respondents have in the company has influenced their answers. We used the Chi-square test and formulated the following hypotheses:

H_0: *There is no dependence between whether representatives of agricultural enterprises think that controller should be also manager and the position they occupy in the company.*

H_1: *There is dependence between whether representatives of agricultural enterprises think that controller should be also manager and the position they occupy in the company.*

Table 1 **Chi-Square test results**

Chi-square test:	
Chi-square (Observed value)	0.4544
Chi-square (Critical value)	5.9915
DF	2
p-value	**0.7968**
Alpha	0.05

Source: Own processing.

The Chi-square test result from table 1 did not confirm the dependence. Since the calculated p-value is greater than the alpha significance level = 0.05, the zero hypothesis cannot be denied. This means that whether respondents think the controller should be a manager at the same time does not depend on the position they occupy in the company. Controller trying to coordinate and regulate processes of company towards achieving success, bears also responsibility for his activities. This responsibility is based on which activities controller does in a business and which tasks he has. In order to deeper investigation of the controllers' position perception from the agricultural enterprises' point of view, we also asked respondents which activities is controller responsible for, and to what extent.

Respondents should assign their answers on the 0 to 5 scale, where 0 is no responsibility, 1 is the minimum responsibility, and 5 is the maximum responsibility. We used the Friedman test to evaluate answers. We have formulated following hypotheses:

H_0: *There are no differences in the importance of activities for which controllers have responsibility.*

H_1: *There are differences in the importance of the activities for which controllers have responsibility.*

Based on comparing theoretical level with level of significance alpha = 0.05 we conclude that the zero hypothesis is rejected and we accept an alternative hypothesis that claims that there are statistically confirmed differences in importance of activities for which are controllers responsible.

Table 2 **Friedman´s test results**

Friedman´s test:	
Q (Observed value)	13.4740
Q (Critical value)	9.4877
DF	4
p-value (Two-tailed)	**0.0092**
Alpha	0.05

Source: Own processing.

For the purpose of more detailed processing of acquired information obtained from respondents' answers, we also applied the Nemenyi's method of multiple comparison, which essence is to determine which random selections are significantly different. The result of Nemenyi's test shows that significant statistical differences in corporate responses are between options for financial management and financial data processing in the form required by business management. Based on the results of our survey, respondents think that the controller is primarily responsible for processing financial data into form that business management requires. Controller's responsibility for activities such as providing information in a timely manner, preparing regular reports and achieving business goals is on average level. According to respondents representing agricultural holdings, controller has the least responsibility in matters relating to the financial management of the company.

Table 3 **Nemenyi's test Results**

Sample	Frequency	Groups	
Financial management	150	A	
Achieving enterprise goals	150	A	B
Preparation of regular reports	150	A	B
Ensuring timely availability of information for business management	150	A	B
Processing of financial data into the form that requires business management	150		B

Source: Own processing.

Based on processing data from questionnaire, 46 farms (31 %) of the sample file has implemented controlling, remaining 104 subjects (69 %) do not. Those who answered positively should further indicate whether there is a comprehensive

system of control in their company. 33 respondents (72%) from those 46 respondents stated that the controller's activities are implemented as a cumulative function and that there is no separate controlling department in their companies. The remaining 13 respondents (28%) replied that there was a separate controlling department in their enterprise. Majority - 8 respondents represented a medium-sized enterprises and 6 respondents were from small businesses. In eight cases, it was a joint-stock company, three limited liability companies and in one case a cooperative. In companies that have a separate controlling department we were examining its character, whether line, staff, or combined. In five enterprises is controlling implemented at the level of operative management (line character), in four companies at top management level (staff character) and in three companies the controlling department has a combined character.

In connection with this question, we have subsequently examined whether fact that enterprises have implemented controlling depend on firm size, legal form of business or on the length of firm's business activity. For evaluation the dependence between the existence of controlling and selected three factors we used the Chi-square test and formulated following hypotheses:

H_0: *There is no dependence between the existence of controlling in the company and size of company (legal form of business, duration of the market activity).*

H_1: *There is dependence between the existence of controlling in the company and size of company (legal form of business, duration of the market activity).*

The power of dependence between existence of controlling in enterprise and three selected factors we measured with Pearson's Phi coefficient, contingent coefficient and Cramer coefficient. When we examined dependence between the existence of controlling in company and the size of company, based on the results of the Chi-square test we can conclude that the zero hypothesis at the level of significance alpha = 0.05 is rejected. This means that there is a statistically confirmed dependence between these factors, and whether companies operating in the field of agriculture have implemented controlling depends on their size. Coefficients expressing dependence strength indicate weak to moderate dependence. In the case of detecting the dependence between the existence of controlling and the legal form of business, it can be said that the result of the Chi-square test has brought again the same result. The Chi-square test demonstrate dependence between these two factors, and so we can say that we accept the H_1 hypothesis at alpha significance level = 0.05. Coefficients concerning with the power of dependency are once again indicate a weak to moderate dependency. The impact of the last investigated factor, the length of the market activity, on the controlling implementation was not confirmed. The Chi-square test did not confirm statistically significant dependence, so we accept a zero hypothesis at alpha = 0.05, and

we can say that duration of businesses activity on the market does not affect the existence of control in an enterprise.

Table 4 **Chi-square test and coefficients of dependence**

Dependence between enterprise size and existence of controlling in company			
Chi-square (Observed value)	12.4781	**Pearson's Phi**	**0.2884**
Chi-square (Critical value)	5.9915	Contingency coefficient	0.2771
DF	2	Cramer's V	0.2884
p-value	**0.0020**		
alpha	0.05		
Dependence between legal form and existence of controlling in company			
Chi-square (Observed value)	9.7564	**Pearson's Phi**	**0.2550**
Chi-square (Critical value)	5.9915	Contingency coefficient	0.2471
DF	2	Cramer's V	0.2550
p-value	**0.0076**		
alpha	0.05		
Dependence between length of the market existence and controlling in company			
Chi-square (Observed value)	8.6221		
Chi-square (Critical value)	9.4877		
DF	4		
p-value	**0.0713**		
alpha	0.05		

Source: Own processing.

In order to determine whether farms apply controlling activities even though respondents stated that controlling in their company was not implemented, we laid another question in the questionnaire. Its aim was to find out which of these activities entrepreneurs in the company realize and in which extent. On scale 0 to 5 respondents should assign values to each activity depending on the level of importance they attach to their business. When 0 is of no importance, 1 is of minor importance and 5 is of maximum importance. First of all we were interested in whether there are differences in the importance of activities carried out by individual enterprises, so we conducted the Friedman´s test and established following hypotheses:

H_0: *There are no differences in the importance of activities carried out by the individual enterprises.*

H$_1$: *There are differences in the importance of activities carried out by the individual enterprises.*

As seen in Table 5 on the basis of a theoretical level comparison with alpha = 0.05, we can state that there are differences in importance of activities performed by individual enterprises, which means that we accept an alternative hypothesis and reject the zero hypothesis about the absence of differences.

Table 5 **Friedman´s test results**

Friedman´s test:	
Q (Observed value)	226.4038
Q (Critical value)	19.6751
DF	11
p-value (Two-tailed)	< 0.0001
alpha	0.05

Source: Own processing.

In order to obtain more detailed results of our analysis, we performed the Nemenyi´s test, which provided us with more comprehensive information about which activities respondents attributed the greatest importance and, on the contrary, the lowest. Based on the respondents' response analysis, it can be concluded that significant statistical differences in responses include collecting and statistical evaluation of information and comparison of spent costs and achieved outputs. Different areas of activities were divided into five groups from least attributed importance (Group A) to the highest recognised importance (Group E).

Table 6 **Nemenyi´s test results**

Sample	Frequency	Groups				
Collecting and statistical evaluation of information	150	A				
Providing recommendation for decision making	150	A				
Reporting providing	150	A	B			
Correcting actions to harmonize plan with reality	150	A	B			
Detecting and identifying deviations	150		B	C		
Communication about financial and operative information	150		B	C	D	

Sample	Frequency	Groups				
Creating Operative and Strategic Plans	150			C	D	
Budgeting	150			C	D	
Cooperation in costing and price calculations	150			C	D	E
Implementation of results-oriented controls	150			C	D	E
Making quality decisions about production or purchasing	150				D	E
Comparison of spent costs and achieved outputs	150					E

Source: Own processing.

The group of activities to which respondents assigned the lowest importance include collecting and statistical evaluation of information and providing recommendation for decision making. At the interface of the first group (Group A) and the second group (Group B) activities are reporting providing, as well as correcting actions to harmonize plan with reality. Average importance was given by respondents to the activities in the second group (group B), the third (group C) and the fourth group (group D). Activities include detecting and identifying deviations, creating operative and strategic plans and budgeting. At the fourth (Group D) and the last (Group E) boundaries, there are activities that are assigned more than average importance, namely: costing-pricing cooperation, performance of results-oriented controls, quality decisions on production or purchase. The highest importance respondents assigned comparison of spent costs and achieved outputs. Based on results can be said that agricultural holdings carry out controlling activities, although not all of them are given adequate attention. Though respondents have attached considerable importance to many controlling activities, those activities that belongs to the core of controlling and which significantly contribute to improving the economic results are in agricultural companies often neglected. The identification of deviations, their analysis and corrective actions targeted on achieving objectives of defined plans, as well as planning itself, reports preparation, creation of budgets are all activities that are an integral part of the controlling process and when are neglected in the business it is reflected in its economy.

4   Conclusion

In conclusion we can state that there are differences in importance of controlling activities implemented by individual business entities. Agricultural companies are most focused on comparing costs and achieved results, and ensuring quality decisions about production or purchase. The small attention of agricultural subjects is devoted to highly important controlling activities as identifying and analysing deviations, or providing reporting for business management. The underestimation of these controlling activities may be due to the fact that controlling is in agricultural companies not very preferred managerial tool. Our analysis resulted that only 31% of agricultural entities have implemented controlling, and its existence in an enterprise depends on the size of the business and the legal form of business. Controlling is in our sample mainly implemented in medium-sized agricultural subjects and in joint-stock companies. Sedliačiková, Vacek and Sopková (2015) confirm, that implementation of controlling in economic practice is generally low in Slovak SMEs. Medium enterprises from the point of view of size and production are frequently recognising the benefits and effects of this instrument.

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FINANCIAL STATEMENT QUALITY PROBLEMS IN THE INSOLVENCY PROCESS

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Abstract

This paper examines financial statement quality problems in the insolvency process for limited liability companies according to the provisions of regulatory acts in Latvia. Empirical studies have been conducted from 2014 till 2017. The author conducted that regulatory acts do not regulate the procedure for financial statement preparing for insolvent limited liability companies in previous studies on accounting problems in the insolvency process. In 2015 Latvia developed new regulations governing the preparation of financial statements. The author researched the draft regulatory acts and found out that they did not consider the existing problems in the preparation of financial statements within the framework of the insolvency process and the author wrote proposals on the improvement of a regulatory act and submitted it to the Ministry of Finance. As a result, the Ministry of Finance acknowledged that the problems found by the author existed and made some improvements in regulatory acts in 2016.

Keywords: *accounting, financial statement insolvency, company*

JEL classification: *G33, G38, K22, M41, M48*

1   Introduction

The insolvency proceedings of a legal person are an aggregate of measures of a legal nature, within the scope of which the claims of creditors are settled from the property of a debtor, to promote the honouring of the debtor's obligations (Insolvency Law, 2010).

An insolvency process is one of the ways to eliminate the business in case a company does not have enough financial resources to pay its creditors. Started from 2010 the Latvian regulatory acts do not define exactly how a company should evaluate its property, claims and obligations in case the company has declared insolvency.

The regulatory acts determine the procedures how to evaluate claims, obligations and property in accounting reports and the presentation of financial reports in case the company or its structural unit is liquidated (Cabinet of Ministers, 2003).

For this reason, most of accounting specialists consider that in cases where a company has an insolvency process, its property, claims and obligations must be applied in the evaluation procedures and the conditions applicable to the company under which its economic activities have been suspended and the company has been closed have to be considered.

The author does not share this point of view and recommends to work on amendments in regulatory acts to improve the business environment, as well as to facilitate collecting correct budget revenue.

The author wrote proposals on the improvement of a regulatory act and submitted it to the Ministry of Finance. As a result, the Ministry of Finance acknowledged that the problems found by the author existed and made some improvements in regulatory acts in 2016.

The research aim is to identify the important problems in the preparation of financial statements of a company's insolvency process in accordance with the requirements of the regulatory enactments of Latvia and to draw attention to the amendments of regulatory enactments made by now and makes accounting and preparing of the financial statement more clearer and comprehensible.

Based on the aim, the following research tasks were set:

- to analyse the legislative and regulatory requirements for property and obligation evaluation in the liquidation process and insolvency proceedings in Latvia;
- to analyse the regulatory act requirements for accounting and financial reporting in the liquidation process and insolvency proceedings in Latvia.

2   Data and Methods

The following qualitative and quantitative methods were employed: the monographic method – in examining, assessing and analysing literatures and legal acts, selecting only the information related to the present research, describing findings and interpretations; logical analysis and synthesis; statistical methods, i.e.

statistical observation, compilation and grouping of information, calculation of statistical data, analysis of causal relationships and data generalisation. The logical construction method was used in analysing results and making judgements.

The present research used studies on the regulatory acts of the Republic of Latvia, statistics of the Register of Enterprises of the Republic of Latvia.

3   Results and Discussion

The existing legislation provides voluntary and forced termination of the activities of a company in Latvia.

According to the statistical data of the Register of Enterprises of the Republic of Latvia, the registration dynamics of limited liability companies (hereinafter the company) was declining in the period from 2008 to 2017 (see Figure 1).

Figure 1 **Dynamics of registration and exclusion of limited liability companies by Latvia's Register of Enterprises in the period from 01.01.2008.-31.12.2016.**
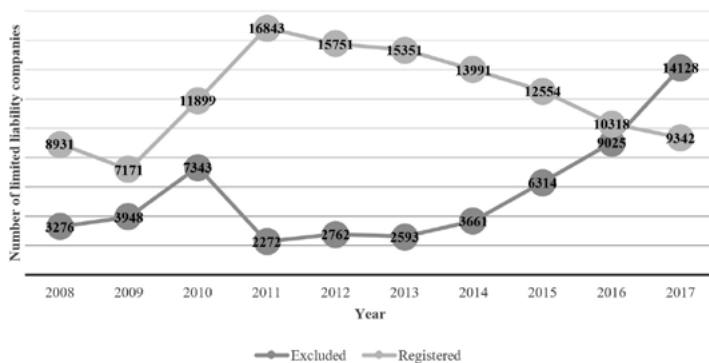
Source: Author's construction based on statistical data of the Register of Enterprises of the Republic of Latvia.

In 2011 were founded 16843 companies which is the highest number of newly registered companies during last seven years. The reason for this is that in the fourth quarter of 2010 entered into force Micro-enterprise Tax Law. By this law was reduced administrative and tax burden for micro-enterprises, especially in the period of commencement of economic activity, and also in the sectors with a low-income level (Micro-enterprise Tax Law, 2010). As of 1 January 2018,

a micro-enterprise turnover is reduced from 100'000 *euro* to 40'000 *euro* in a calendar year and a micro-enterprise tax increasing from 9% of turnover in 2010-2014 up to 15% from 2017 the part of micro-enterprises stopped their economic activity and where excluded from the Register of Enterprises. The number of excluded or liquidated companies constantly increased at the same time. The number of excluded companies accounted for 13.49% of the total founded companies in 2011, but in 2017 the number of excluded companies comprised 151.23% of the total new registered companies. The number of excluded companies includes companies which are closed through the ordinary procedure of the liquidation without using the instruments of insolvency proceedings and companies which are liquidated during insolvency and bankruptcy proceedings as well.

During the recent seven years, on average, 809 legal persons and 1399 natural persons were declared insolvent (see Table 1), which negatively affected tax collection in Latvia.

Table 1 **Distribution of the number of insolvency cases registered in Latvia by characteristic of insolvency proceedings in the period of 01.01.2008.-31.12.2017.**

Year	Proclaimed insolvency cases (total)		Insolvency cases for natural persons		Insolvency cases for legal persons	
	number	%*	number	%*	number	%*
2008	1290	-	1	-	1289	-
2009	2202	71%	53	5200%	2149	67%
2010	2773	26%	199	275%	2574	20%
2011	1729	-38%	850	327%	879	-66%
2012	2256	30%	1375	62%	881	0%
2013	2392	6%	1572	14%	820	-7%
2014	2256	-6%	1297	-17%	959	17%
2015	2431	8%	1629	26%	802	-16%
2016	2270	-7%	1539	-6%	731	-9%
2017	2118	-7%	1528	-1%	590	-19%
Total:	**21717**	-	**10043**	-	**11674**	-

* Percentage change from the previous period
Source: Author's calculations based on statistical data of the Register of Enterprises of the Republic of Latvia, Insolvency Register.

In 2008 Latvia passed a new insolvency law which allows for the first time financially distressed companies to continue operating by pursuing reorganisation. The reform also strengthened the qualification standards for bankruptcy administrators. In 2010 Latvia introduced a mechanism forout-of-court settlement of insolvencies to alleviate pressure on courts and tightened some procedural deadlines and adopted a new insolvency law that streamlines and expedites the insolvency process and introduces a reorganisation option for companies (World Bank, 2014). The legislature determined that the company which is being liquidated must prepare the closing financial statement to inform company's creditors and other third parties on the process and the solution. But in the same time, the legislation does not define exactly how the company should evaluate its property, requirements and obligations in case the company has declared insolvency.

From 2003 laws determine the procedures how to evaluate claims, obligations and property in accounting reports and the presentation of financial reports in case the company or its structural unit is liquidated. For this reason, most of accounting specialists consider that in cases where a company has an insolvency process, its property, claim and obligations must be applied in the evaluation procedures and the conditions applicable to the company under which it economic activities have been suspended and the company has been closed have to be taken into consideration.

Analysing of the existing legislative and regulatory requirements, not only directly regulate the accounting and financial reporting, the author does not share this point of view, for the following reasons:

1. The legislature determine that the purpose is to promote the honouring of the obligations of a debtor in financial difficulties and, where possible, the renewal of solvency. So, the insolvency proceeding, by its very nature, does not mean that the company will be liquidated because the primary objective is to restore its solvency;

2. The Insolvency Law provides the right of the transition from legal persons' insolvency process to legal protection process. Therefore, it is necessary to evaluate and understand whether the company's activity within the insolvency proceedings from the accounting point of view conform or do not conform to the going concern principle. In addition, the legislator has established a procedure for suspension of the company's economic activity of the insolvency proceedings;

3. In practice part of the companies after the day when the court has proclaimed insolvency proceedings continues economic activities for at least a year or for several more years, especially if the company owns property, which can be leased for rental revenue (Kelmere, 2016).

According to previous studies the author pointed below-listed problems in accounting and preparing the financial statement in the insolvency process if consider the regulatory acts for the companies that are liquidated in ordinary order (without insolvency):

1. The financial statement does not provide correct information about the company's financial position and lucrative long-term investment. Therefore, the investors could make wrong decisions not to invest in this company and without investments the company must use the bankruptcy procedure;

2. Revenues and expenses are not harmonised within the reporting period. The property revaluation downwards up to the expected net proceeds of the sale, which is usually a forced sales value, make large expenses. If not reclassifying the property from long-term investments in current assets, then continue to calculate the depreciation and includes it in expenses and in the same period includes revenue from using long-term investment, for example, lease building or offices, and at the end of the period the financial report of the company should be correct - the profit or loss of the period according to real business situation;

3. As the one of the fundamental principles of the insolvency process is the principle of respect for the interests of creditors that it is particularly important to ensure legal certainty and security business environment (Insolvency Administration, 2012) and according to the special regulatory acts for insolvency the revaluation of liabilities during the insolvency process should be carried out at least twice and after each revaluation one should prepare a financial report for presentation of the financial position and financial performance of a company to third parties including creditors.

In 2015 Latvia developed new regulations governing the preparation of financial statements. The author examined the draft regulatory acts and found out that they did not consider the existing problems in the preparation of financial statements within the framework of the insolvency process and the author wrote proposals on the improvement of the regulatory act and submitted it to the Ministry of Finance. For example, to use correct terminology according to insolvency cases (the draft regulatory act was taken into account and corrected). The author drew the attention of the legislator to the fact that the new legislative act did not provide specific requirements how to evaluate a company's property, claim and obligations and requirements for preparing its financial reports, including an annual report, within the framework of insolvency proceedings, as well as to the fact that

the new legislative act was not in line with the requirements of other regulatory acts (Kelmere, 2016).

As a result, the Ministry of Finance acknowledged that the author's found problems existed and made some improvements in the regulatory acts but all of them were not accepted yet by other ministries, and at the end of 2015 the inter-institutional meeting decided to create a special working group in 2016, which would work on the legislative amendments to balance between the various requirements of the regulatory enactments regarding the preparation of financial statements of the insolvency process (Cabinet of Ministers, 2015).

In 25 October 2016 come in to force amendments regulatory acts in accounting and by them clarified the requirements for accounting and the financial statement preparation in the insolvency proceedings (Amendments to the Law on Accounting, 2016) like:

- In the insolvency proceeding if the administrator has taken a decision to stop the economic activity of the debtor then for preparing the financial repot he should take into account the procedures how to evaluate claims, obligations and property in accounting like the company or its structural unit is liquidated;
- In the insolvency proceeding when the administrator has taken a decision to continue the economic activity of the debtor to full or restricted extent the financial statement shall be prepared by principle for continuing the activity – shall be assumed that undertaking will be operating also in the future. It should be used till insolvency administrator made decision to stop the economic activity of the debtor and start the bankruptcy procedure;
- While the insolvency process for debtor continues - for each accounting year shall draw up a balance sheet and a profit or loss account and an annex to the financial statement.

Some more improvements should be done in the future. For example, there are no unambiguously understandable should just be prepared a balance sheet, a profit or loss account and an annex to the financial statement for each accounting year or need to be prepared the financial statement and submitted to the State Revenue Service.

4   Conclusion

1. The registration dynamic of limited liability companies was declining in the period from 2011 to 2017, but at the same time the number of excluded or liquidated companies constantly increase. The number of excluded companies

comprised 13.49% of the total companies founded in 2011, but in 2017 the number of excluded companies comprised 151.23% of the total new registered companies. The number of excluded companies includes companies which are closed through the ordinary procedure of the liquidation and companies which are liquidated during insolvency and bankruptcy proceedings as well.

2. During the recent seven years, on average, 809 legal persons and 1399 natural persons were declared insolvent.

3. Till the end of the 2016 the Latvian legislation does not define exactly how a company should evaluate its property, claims and obligations in case the company has declared insolvency. But the regulatory acts determine the procedures how to evaluate claims, obligations and property in accounting reports and the presentation of financial reports in case the company or its structural unit is liquidated.

4. In 2015 Latvia developed new regulations governing the preparation of financial statements. The author examined the draft regulatory acts and found out that they did not take into account the existing problems in the preparation of financial statements within the framework of the insolvency process and wrote proposals on the improvement of the regulatory acts and submitted it to the Ministry of Finance.

5. As a result, the legislator made some important improvements in the regulatory acts and it is helps to do better accounting and financial statements during insolvency proceedings, but some more improvements should be done in the future (to determine that financial statement should be submitted to the State Revenue Service).

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FINANCIAL FORM OF BALANCE SHEET – INFORMATION SOURCE FOR THE ASSESSMENT OF COMPANY ASSETS AND CAPITAL RETENTION

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Abstract

For financial management, it is important to monitor the company's main financial parameters, to compare them with the forecast state and to take measures to guide their development in the desired direction. The primary task of accounting is to provide a true and fair view on assets, revenues and financial situation of a company. The analysis of the company assets changing trends of the entity should be one of the most important tasks of the financial analysis for the assessment of the financial situation of the company. Currently the issue of company assets is analysed by the majority of authors in the range in which it is solved within the IFRS Conceptual Framework in the part Concepts of Capital and Capital Maintenance. To the analysis of the company assets we can approach from two points of view: from the owner´s point of view who attempts to increase equity and from the manager´s points of view who attempts to preserve the business property. The assessment of property substance of a company and the effectiveness in invested capital arise from the Financial Statements, mainly from the Balance Sheet. In the article the Balance Sheet is presented as the basic source of information for the quantification of company assets. We have drawn the theoretical basis for the apprehension of company assets. The stated theoretical basis is applied on the concrete selected companies.

Keywords: *accounting, financial statements, Balance Sheet, company assets*

JEL classification: *M 21, M 40, M 41*

1   Introduction

Ongoing internationalization and permanently growing world globalization processes shape the market and influence business activities, demands and needs of enterprises (Országhová et al., 2016). In order to secure the sustainable development in the context of global economic changes it is indispensable to permanently create appropriate competitive, investment, financial and business environment. The entire social attitude towards a business subject firstly established for the purpose of acquiring of profit is reassessed. The interested parties are not involved only in current financial situation of company but mainly in the total view of all available aspects of assessment in the social environment of its influence in the context of long-term sustainability (Pakšiová, 2017). The future of a successful business is primarily based on the knowledge of the functioning of its own in-house management system (Dobošová, et al., 2017). Data and information enhanced by knowledge are driving force of the present times. To succeed in fighting with the competition, data and information must flow in the whole decision-making process (Šilerová et al., 2016). Content and quality of information is the assumption of efficiency of decision-making and managing processes of business subject. The accounting provides the set of information on economic reality of accounting entity in monetary terms.

Globally the pressure of users on the reliability, objectivity and comparability of accounting information increases as important decisions are made with long-term implications based on them (Baštincová, 2016). The financial statements present the main source of information from the accounting for several groups of users. They contain mainly quantitative indicators which are defined as financial information (Šlosárová, 2017). Balance Sheet, Profit and Loss Statement and Notes belong to the basic parts of financial statements in the double entry accounting in Slovakia. The mutual interconnection of individual parts of financial statements is combined with several indicators which numerical expression derives from other statements, respectively is explained in Notes. The most crucial information which the management acquires from the financial statements is the status of assets and the rate of its retention, increase respectively erosion in time. The assessment of company assets and effectivity of invested capital in them derives from the statements of financial statements, namely from the Balance Sheet.

2   Data and Methods

The company assets can be differently considered. If the assessment of entrepreneurship results derives from the apprehension of company assets in the

accounting, it presents mainly the determination of its development in time. As the quantification of company assets is performed from the items of Balance sheet, i.e. the status indicators so the numerical expression of company assets presents its status as at the exactly defined moment of company existence. The most often it presents the date at which the financial statements are prepared. Mostly the data defined in the Balance Sheet of ordinary financial statements are used. One of the most important tasks of financial analysis should be the detailed analysis of company assets development.

In the article the Balance Sheet is presented as the basic source of information for the quantification of company assets. We have drawn the theoretical basis for the apprehension of company assets. The stated theoretical basis is applied on the concrete selected companies. Based on the conducted calculations and from them deriving results we have assessed whether in the analysed companies the assets have been retained. The source of article processing was mainly the scientific literature, actual legal arrangements of accounting in the Slovak Republic (Act on Accounting and Accounting Procedures) and the financial statements of selected companies for the period of years 2013 - 2016, which we have identified as XY and XZ. As regards the individual manners of apprehension and explanation of a given issue we have derived from the use of inductive-deductive and analytical-synthetic logical scientific methods.

3   Results and Discussion

3.1   Accounting and company assets

The accounting presents the system of following, measuring and classification of facts of economic activity which generalizes and submits information to the management of economic processes. The basis for the accounting understanding (Dvořáková, 2014) is the apprehension of substance of economic activity (of an accounting entity), its specifics and not only in microeconomic relations but as well as in macroeconomic context which forms the environment and in which an accounting entity undertakes.

The accounting has an ability to record the real process of business activity and enables the assessment of achieved results. The primary task of accounting is to provide true and fair view on assets, revenues and financial situation of a company. The company financial situation systematically and complexly presents the quality of business activities, its economic level and therefore it manages to identify weaknesses and strengths of business activities.

Currently there exist diverse theories of assets apprehension. Therefore it is indispensable to determine different conceptions of company assets retention in detail. An accounting entity shall take into account the concrete manner of measurement of assets and liabilities and as well as the determination of profit in the accounting. In case the process of results assessment derives from the company assets apprehension in the accounting, it mainly presents the determination of its development in time. As the quantification of company assets is performed from the items of Balance Sheet, therefore from the status indicators, also the numerical expression of company assets presents its status as at the concrete moment of company existence. The most often it presents the date at which the financial statements are prepared. Mostly the data defined in the Balance Sheet of ordinary financial statements are used.

Each company enables to perform its activity so that at the end of accounting period it is "more wealthy" than at the beginning of accounting period. Generally we can state that the basic measure of wealth is profit which is included in the equity, so the company wealth increases also with the increase in equity. The biggest interest in wealth increase and therefore the increase in equity is presented by investors (owners, shareholders). The requirements of owners for company assets derive from the value of equity therefore we talk about the retention respectively the increase in company assets (Šlosárová & Blahušiaková, 2017).

In order to define different apprehensions of company assets and to decide which of them will be applied in a given system presents the basis of our further analysis applying concrete methodological manners. The basic apprehension of company assets can be differentiated as follows:

- capital – the view on assets from the point of invested capital,
- assets – the view on assets from the point of its character and structure,
- performance – the view on assets from the point of means used to achieved the company performance.

The further classification can be into absolute and relative as regards the manner of its expression.

A1. Absolute capital apprehension of company assets is expressed in the absolute amount of ratio of owners invested capital in monetary terms.

A2. Relative capital apprehension of company assets is expressed as the ratio of invested capital of owners in the total amount of capital – own and foreign.

B1. Absolute expression of company assets apprehension is quantified by the total amount of assets in monetary terms.

B2. Relative apprehension of company assets determines the relative expression of individual parts of company assets which presents the quantification of ratio of

individual items of assets on the total amount of assets. In the complex summary it presents one hundred percent of assets.

C1. Absolute performance apprehension of company assets is expressed in the absolute amount of performance - total capacity of production in produced units based on the ownership of company assets, e.g. per day.

C2. Relative performance apprehension of company assets presents the calculation of relative ratio of assets items to acquired production. The total assets in this expression present one hundred percent (Pakšiová, 2014).

The apprehension of company assets and determination manners of its retention as an indicator of effectivity of invested capital in a company can be crucial for an investor in certain moments as regards the decision-making whether to invest free financial sources to an accounting entity or not. Currently the issue of own capital retention is treated by the Conceptual framework of financial reporting while two manners of own capital apprehension and its retention are differentiated:

- **Financial apprehension of capital**, based on this apprehension the capital is considered to be the synonym for the equity or net assets. In the accounting of each accounting entity the equity and net assets are determined in the same manner – as the difference of total assets and liabilities, therefore their values are the same. In case an accounting entity decided to apply the balance sheet principle so they are differentiated by the content. Pursuant to the financial apprehension of own capital an accounting entity reaches the profit only in such a case if the sum of equity is higher at the end of accounting period than the sum of equity at the beginning of accounting period. Contributions and withdrawals of owners during this accounting period are not taken into account. If the users of information from the financial statements are primary interested in the retention of nominal value of invested capital or the purchasing power of invested capital in such a case the before stated financial apprehension of capital shall be accepted. The equity represents the own sources of financing in an accounting entity therefore it is a suitable measure for the determination of company assets in financial (monetary) apprehension.
- **Physical apprehension of capital** is expressed by the production ability. The own capital is considered to be the production capacity of company which shall be expressed in physical measure units (e.g. in the number of produced products per day). IFRS recommend adopting the physical apprehension of capital when the users of information from the financial statements are more interested in the production ability of an accounting entity. The net assets are considered to be the basis and the measure of determination of company assets treated as the company production ability.

In the Slovak Republic as well as in the majority of companies in the world the financial apprehension of capital is applied which considers the own capital as a synonym of net assets or equity. The company reaches the profit only if the sum of net assets at the end of accounting period is higher than the sum of net assets at the beginning of accounting period while the contributions and withdrawals of owners during this period are not taking into account. The calculated change of equity in a current accounting period in comparison with the prior accounting period determines whether the company retained, increased or decreased its company assets.

The vertical (financial) form of Balance Sheet is considered to be a base for the assessment of development of company assets. The main meaning of such a form of Balance Sheet is the calculation of some financial indicators which directly relate to the assessment of company assets. Based on it the net assets and equity can be directly calculated. This form of Balance Sheet directly represents the title of owners to company assets. The most significant indicator in such a form of Balance Sheet is considered to be the net working capital which is directly calculated in the Balance Sheet as the difference of current assets and current liabilities. It is utilized e. g in the assessment of company liquidity. In order to calculate it, the current and non-current liabilities must be taken into account which present the owners titles to company assets.

3.2 Assessment of assets in the example of selected accounting entities

The before stated theoretical basis which relate to company assets have been applied to two concrete companies which we have identified as XY and XZ. These companies have been specializing in the production of fresh, air-cooled and deep-frozen poultry and the production of poultry products since the beginning of their existence. In our example we derive from the data of financial form of Balance sheet for the years 2013 - 2016. We compare the change of equity in a current accounting period in comparison to a prior accounting period and submit whether the companies retained their company assets, enhanced it or decreased their company assets.

Table 1 **Vertical form of Balance Sheet of the company XY in EUR**

	2014	**2013**
A. Non-current assets	23 382 098	24 520 591
B. Current assets	13 492 144	15 711 675
C. Current liabilities	10 026 469	9 393 727

	2014	2013
D. New working capital (net current assets) (B. – C.)	3 465 675	6 317 948
E. Non-current liabilities	77 656	236 110
F. Net assets (A. + D. - E.)	26 770 117	30 602 429
G. Equity (A. + B. - C. - E.)	26 770 117	30 602 429

Source: Balance Sheet of the company XY, own processing.

As we have stated we derived from the data of financial form of Balance Sheet and found out that the equity in the accounting period 2014 was lower than the equity in the accounting period 2013 and simultaneously the net assets in the accounting period 2014 were lower than the net assets in the accounting period 2013. Therefore it means that the company did not succeed to increase, enhance its company assets in the year 2014. The company assets decreased.

Table 2 **Vertical form of Balance Sheet of the company XY in EUR**

	2015	2014
A. Non-current assets	22 569 807	23 382 098
B. Current assets	15 057 944	13 492 144
C. Current liabilities	11 465 170	10 026 469
D. New working capital (net current assets) (B. – C.)	3 592 774	3 465 675
E. Non-current liabilities	89 477	77 656
F. Net assets (A. + D. - E.)	26 073 104	26 770 117
G. Equity (A. + B. - C. - E.)	26 073 104	26 770 117

Source: Balance Sheet of the company XY, own processing.

In the following compared period the analysed company also did not enhance its company assets. We found out that the equity in the accounting period 2015 was again disclosed lower in comparison with the equity in the accounting period 2014 and at the same time the net assets in the accounting period 2015 were lower in comparison with the net assets disclosed in the accounting period 2014. Therefore the company again decreased its company assets and did not succeed to enhance it in the following year.

Table 3 **Vertical form of Balance Sheet of the company XY in EUR**

	2016	2015
A. Non-current assets	23 058 431	22 569 807

	2016	2015
B. Current assets	15 962 109	15 057 944
C. Current liabilities	11 970 795	11 465 170
D. New working capital (net current assets) (B. – C.)	3 991 314	3 592 774
E. Non-current liabilities	91 112	89 477
F. Net assets (A. + D. - E.)	26 958 633	26 073 104
G. Equity (A. + B. - C. - E.)	26 958 633	26 073 104

Source: Balance Sheet of the company XY, own processing.

In the last comparison of accounting periods we found out that the equity in the accounting period 2016 was for the first time higher than the disclosed equity in the accounting period 2015 and at the same time the net assets in the accounting period 2016 were higher than the disclosed net assets in the accounting period 2015. We found out that in comparison with these accounting periods the company increased, i. e. enhanced its company assets for the first time.

Table 4 **Vertical form of Balance Sheet of the company XZ in EUR**

	2014	2013
A. Non-current assets	1 719 860	1 817 171
B. Current assets	4 253 305	4 364 031
C. Current liabilities	764 616	872 231
D. New working capital (net current assets) (B. – C.)	3 488 689	3 491 800
E. Non-current liabilities	606 864	610 401
F. Net assets (A. + D. - E.)	4 601 685	4 698 570
G. Equity (A. + B. - C. - E.)	4 601 685	4 698 570

Source: Balance Sheet of the company XZ, own processing.

In the second analysed company we have also derived from the data of financial form of Balance Sheet and found out that the equity in the accounting period 2014 was lower as the equity disclosed in the accounting period 2013 and at the same time the net assets in the accounting period 2014 were lower than the net assets in the accounting period 2013. Therefore the company did not succeed to increase, enhance its company assets.

Table 5 **Vertical form of Balance Sheet of the company XZ in EUR**

	2015	2014
A. Non-current assets	1 896 786	1 719 860
B. Current assets	4 200 884	4 253 305
C. Current liabilities	820 358	764 616
D. New working capital (net current assets) (B. – C.)	3 380 526	3 488 689
E. Non-current liabilities	481 858	606 864
F. Net assets (A. + D. - E.)	4 795 454	4 601 685
G. Equity (A. + B. - C. - E.)	4 795 454	4 601 685

Source: Balance Sheet of the company XZ, own processing.

In the following compared period the company succeeded to enhance its company assets. We found out that the equity in in the accounting period 2015 was higher in comparison with the equity disclosed in the accounting period 2014 and at the same time the net assets in the accounting period 2015 were also higher in comparison with the net assets disclosed in the accounting period 2014. The company slightly increased its company assets.

Table 6 **Vertical form of Balance Sheet of the company XZ in EUR**

	2016	2015
A. Non-current assets	3 659 805	1 896 786
B. Current assets	2 396 618	4 200 884
C. Current liabilities	679 526	820 358
D. New working capital (net current assets) (B. – C.)	1 717 092	3 380 526
E. Non-current liabilities	483 803	481 858
F. Net assets (A. + D. - E.)	4 893 094	4 795 454
G. Equity (A. + B. - C. - E.)	4 893 094	4 795 454

Source: Balance Sheet of the company XZ, own processing.

In the last comparison of accounting periods the second company again disclosed the higher equity in the accounting period 2016 than the equity in the accounting period 2015 and at the same time the net assets in the accounting period 2016 were higher than the net assets disclosed in the accounting period 2015. We can state that in the comparison of these accounting periods the company also increased therefore enhanced its company assets what is considered to be positive. The retention of own capital in the financial apprehension is measured:

- in nominal (monetary) units,
- in units of permanent purchasing power of cash.

Pursuant to the financial apprehension of own capital retention where the own capital is expressed in nominal monetary value, the profit presents the increase in the nominal value of own capital during the accounting period, i. e. the profit is the difference between the closing and opening status of equity in the nominal monetary units. The increase in the prices of assets during the period presents the non-realized profit, i. e. till the disposal of such assets the increase in the assets prices shall not be presented as realized profit.

Balance Sheet of the company XY .

Balance Sheet 31. 12. 2015			Balance Sheet 31. 12. 2016	
37704575	**Equity without profit** 23832134		39114701	**Equity without profit** 26850739
	Profit 2240970			**Profit** 1955380
	11631471			10308582

Source: Balance Sheet of the company XY, own processing.

Balance Sheet of the company XZ .

Balance Sheet 31. 12. 2015			Balance Sheet 31. 12. 2016	
6121077	**Equity without profit** 4639423		6092325	**Equity without profit** 4785200
	Profit 156031			**Profit** 107894
	1325623			1199231

Source: Balance Sheet of the company XZ, own processing.

4   Conclusion

The basis for accounting apprehension is the understanding of substance of company (accounting entity) economic activity and its specifics. The assessment of

company assets and effectivity in its invested capital derive from the financial statements, namely from the Balance Sheet. Currently the issue of company assets is treated by several authors in the range in which it is solved in the Conceptual framework of IFRS in the part Conception of capital and retention of own capital. The approach towards the company assets in the division according to the needs of users for information from the financial statements is preferred. The before stated fact corresponds with the understanding from the point of financial accounting which puts company assets directly to the relation with capital (own capital). It derives from the balance sheet equation.

When comparing two statuses of company assets in the following periods the users are interested whether the status of company assets is preserved in the later period from the compared periods. Only then the erosion of company assets and the depreciation of capital are not presented. Such a comparison is meaningful only in case that both statutes of company assets are calculated on the basis of the same assumptions, i. e. the same applied understanding of company assets using the relevant methods of measurement.

The article quantifies the company assets from the items of vertical form of Balance Sheet, i. e. the status indicators in two companies. They have been identified as the company XY and the company XZ. We can conclude based on the results of performed comparisons that in the observed period of years 2014-2013 the company XY and even the company XZ did not succeed to increase, enhance their company assets. In the following comparison of the years 2015 and 2014 the company XY did not succeed to increase, enhance its company assets, they repeatedly decreased. Vice versa in a given period the company XZ enhanced its company assets. Only in the last comparison of accounting periods of the years 2016-2015 the both assessed companies succeeded to increase, enhance their company assets.

Acknowledgements

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LOCAL FEE FOR MUNICIPAL WASTE AS A PART OF TAX BUDGET REVENUES OF MUNICIPALITIES

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Abstract

The waste management belongs to the biggest challenge of environment. The task of article is the survey and the assessment of local fee for municipal waste in the selected municipality of Nitra region in the SR. Local fee for municipal waste and minor construction waste is levied by the municipality pursuant to the Act on Local Taxes and Local Fees and its amount is determined in a generally binding regulation. Revenues of local taxes and revenues of local fees are the part of tax budget revenues of each municipality. In the reviewed municipality, legal entities and individual entrepreneurs pay as much as they produce, the fee rate depends on the bin volume and the frequency of collections. The fee rate of non-individual entrepreneurs is determined on a lump sum basis. The rate of waste recovery in the SR is one of the lowest in the EU and the landfilling is still a dominant form of municipal waste management. From the survey of reviewed municipality, it derives that in the year 2016 almost 35% from the total amount of waste is recovered. However, as regards the amount of generated waste and the amount of landfill of selected municipality it is recommended to consider the increase in the fee rate for municipal waste and minor construction waste.

Keywords: *budget, local fee, local fee for municipal waste, municipality, tax revenues*

JEL classification: *H71, H72, K39, R11*

1   Introduction

EU waste management policies aim to reduce the environmental and health impacts of waste and to improve the EU's resource efficiency. The long-term aim of these policies is to reduce the amount of waste generated and when waste generation is unavoidable to promote it as a resource and achieve higher levels of recycling and the safe disposal of waste (Eurostat, 2017).

Pursuant to the Programme of waste management of the SR for the year 2016-2020 the minimization of negative impact of waste generation and manipulation to human health and the environment is a crucial task of waste management till the year 2020.

According to Soukupová & Bakoš (2017) the municipalities are traditional providers of basic public services for inhabitants and as regards their size, range of services and financial possibilities they select the manner of waste securing.

Furthermore, Gašparíková (2010) states that the municipality is obliged to secure collection, transport, degradation and disposal of municipal waste and minor construction waste arising in its territory including the securing of waste bins.

The municipality amends the details concerning the management of municipal waste and minor construction waste by a generally binding regulation in which the manner of collection, municipal waste transport, the manner of sorted collection of individual items of municipal waste, the manner of manipulation with minor construction waste as well as the places determined for the storage of such waste and waste degradation and reasons for non-application of sorted collection of biodegradable municipal waste are defined (Bojňanský et al., 2017).

The most important financial tool of local development conditions of municipalities are local taxes and local taxation (Žárska, 2008). Beličková & Boór (2016) and Pavel et al. (2009) represent a specific group of public revenues focusing on the environmental policy.

Waste within the public sector corresponds with such a use of public resources that violates the principles of economical, efficient and effective management of public resources. The fact that consumption increases waste is obvious (Půček, 2013).

According to Kirkman & Voulvoulis (2017) modern waste management provisions seeks to meet challenging objectives and strategies while reflecting community aspirations and ensuring cost – effective compliance with statutory obligations.

2   Data and methodology

The article presents the theoretical and practical view on the issue; it deals with the issue of assessment and determination of local fee for municipal waste and minor construction waste in the selected municipality of Nitra region in the SR.

Local fee for municipal waste and minor construction waste is paid for activities combined with the activities related to the manipulation with mixed municipal waste, biodegradable municipal waste and sort collection of municipal waste. The obligations concerning the rate and fee determination as well as its administration are enacted by the Act No. 582/2004 Coll. on Local Taxes and Local Fees as amended (farther referred to as "Act on Local Taxes and Local Fees").

In case of pay-as-you-produce collection the local fee (hereinafter referred to as "LF") is determined as a multiplication of collection frequency (hereinafter referred to as "CF") and fee rate (hereinafter referred to as "FR") and bin volume (hereinafter referred to as "BV").

$$LF = CF \ x \ FR \ x \ BV \qquad (1)$$

If there is no pay-as-you-produce collection, the local fee for waste is determined as a multiplication of fee rate and the number of calendar days (hereinafter referred to as "NCD") within which a tax payer has or will have a permanent or temporary residence or the days within which he uses a real estate or is authorized to use it.

$$LF = FR \ x \ NCD \qquad (2)$$

The general information source for the processing of particular issue is presented by the data obtained from the annual report on municipal waste of the reviewed municipality for the year 2016. The data concerning the amount of produced waste by the municipality were taken from the annual report on municipal waste by which a statistical determination is performed and the municipality is obliged to submit it to the Statistical Office of the SR or from database of Eurostat.

The reviewed municipality is represented by the municipality from Nitra region of the SR and is the member of the association of municipalities called "Ponitrianske združenie obcí" for the sorted collection and waste management. This association acts as an interest association of legal entities. The subject of association activities is a long-term complex management of waste arisen in the municipality territories which are the association members, as well as the decrease in the volume of stored waste, the solution of problematic effects in waste management of member municipalities. Currently the association consists of 65 member municipalities of Nitra region.

The basic methodical approach of processing in a theoretical as well as in a practical level is presented by standard methods of scientific work such as selection, analysis, comparison, deduction and synthesis.

3 Results and discussion

The budget is a crucial tool of financial politics applied in the regional self-administration of the SR. The particular document presents the financial relations within the municipality as well as the relations towards individual budgets of public administration subjects. The management of municipality is governed in the relevant calendar year by the approved budget which secures the financing of tasks and functions of the municipality.

Within the current budget of municipality the significant own tax revenues are presented by revenues of local taxes and revenues of local fees pursuant to the Act on Local Taxes and Local Fees. Pursuant to the above mentioned Act, the municipality performs the administration of local fee for municipal waste and minor construction waste.

The local fee for municipal waste and minor construction waste is paid for municipal waste generated in the territory of municipality except for the sorted waste namely electro waste, biodegradable waste and packaging waste and non-packaged products (e.g. paper, plastics, glass, metals).

According to the Act on Local Taxes and Local Fees, a person who is obliged to pay a fee (further referred as "taxpayer") is as follows:

- an individual with a permanent or temporary residence or an individual who has right to use or uses a real estate,
- a legal entity which authorised to use or using a real estate located in the territory of the municipality for other than business purposes,
- an entrepreneur which authorised to use or using a real estate located in the territory of the municipality for business purposes.

The municipality levies and determines the rate of local fee for municipal waste and minor construction waste by a generally binding regulation, while the Act on Local Taxes and Local Fees defines a minimal and maximal fee rates for a taxpayer and a calendar day. If the municipality does not determine a fee, the lowest rate is applied which is levied by the Act on Local Taxes and Local Fees. The local fee rate is defined depending whether the pay-as-you-produce collection is applied in the municipality.

The local fee rate should present the average cost of municipality needed for the activities combined with the management of municipal waste and minor

construction waste including the costs related with the securing of waste bins for pay-as-you-produce collection. The local fee can contain:

- costs for waste bin for mixed municipal waste,
- costs for waste bins for sorted waste.

The local fee can be levied by the municipality in the form of lump sum or in case of pay-as-you-produce collection it depends on the waste bin volume and the frequency of removals. If the municipality introduces the pay-as-you-produce collection, the fee is determined as the multiplication of collection frequency and bin volume (1). If the pay-as-you-produce collection is not applied, the fee is determined as the multiplication of fee rate and the number of calendar days within which a taxpayer will have a permanent or temporary residence or within which he will use a real estate or is authorized to use it (2). Should the pay-as-you-produce collection applies, the municipality is obliged to enable people the individual interval determination of waste collection or enable the selection of waste bin size from three size categories at least.

As regards the particular issue the survey of municipal waste collection was conducted and the local fee for municipal waste and minor construction waste was reviewed in the selected municipality of Nitra region of the SR. This particular fee is determined pursuant to the Act on Local Taxes and Local Fees. The pay-as-you-produce collection is applied in the municipality for legal entities and as well as for individual entrepreneurs. Pursuant to the generally binding regulation the municipality determined the fee rate for pay-as-you-produce collection for the waste bin with a volume 1,100 litres for a calendar year for collection (i) twice per month in the amount of EUR 228, (ii) once per month in the amount of EUR 114.

Furthermore, the municipality levies the fee rate to the taxpayers for whom the pay-as-you-produce collection is not applied, as follows:

- in the amount of EUR 0.0439 a person and a calendar day in cases not covered by the pay-as-you-produce collection (in the amount of EUR 16 per person) and a calendar year for an individual who has a permanent or temporary residence in the municipality or in the territory of assessed municipality has right to use or who uses an apartment, non-residential premises, ground building or its part,
- in the amount of EUR 2.50 a person and a calendar day in cases for which the rate for pay-as-you-produce collection is not applied, in case who has not a permanent or temporary residence in the municipality,
- in the amount of EUR 40 a person and a calendar year for an entrepreneur and a legal entity,

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- in the amount of EUR 0.015 per kilogram of minor construction waste without the content of pollutants for the collection of minor construction waste which are classified to the regime of pay-as-you-produce collection.

The municipal waste generated in the municipality territory is disposed in the waste dump Rišňovce-Rumanová. The biodegradable waste arising in the municipality territory is collected to colourful brown bins placed in households and is recovered in the composting plant in Výčapy-Opatovce. The transport of biodegradable waste from gardens, parks and public spaces (branches, roots, shrubs, vine leaves and etc.) is secured as well twice a year by means of contracted partner to the composting plant in Výčapy-Opatovce. Collection is realized in the collection place determined by the municipality to pre-parked large-capacity containers. The particular items of municipal waste from sorted collection are transported to the final-sort plant in Lužianky. The collection and removal of bulky waste from households is performed by bulky containers. The collection of bulky waste is performed twice a year (spring and autumn collection of bulky waste) in the places determined by the municipality. Edible oils are collected by a delivery method to bins placed near the municipal office during the working time.

The assessed municipality has concluded the contract with an authorized person performing the collection of electro waste, lubricating oils, dyes, chemicals and other hazardous waste in the territory of municipality. The municipality has established the collection yard where all the items of municipal waste except for hazardous waste can be delivered.

4   Conclusion

The local fee for municipal waste and minor construction waste is determined by the municipality pursuant to the Act on Local Taxes and Local Fees in the generally binding regulation. Revenues deriving from fees serve solely to the municipality for the reimbursement of costs combined with the collection, transport and disposal of waste. The local fee is a real financial tool for municipalities to acquire resources in order to cover the costs of the particular waste producers presented by legal entities and individuals.

In 2016 the municipal waste per capita in the selected municipality presented the amount of kilogram 292.83 (Annual report on municipal waste of the municipality, 2016). In respect of the process of trend observation of the amount of generated waste in the SR a slight increase can be stated. While in 2011 there was the amount of kilogram 327.39 per capita and in 2016 a total amount of generated waste per capita presented the amount of kilogram 348 (Eurostat, 2017).

By comparison with the above mentioned values, it can be concluded, that the reviewed municipality produced less amount of municipal waste per capita.

On the other hand, in the year 2016, the amount of recovered waste per capita, in the reviewed municipality, presented the amount of kilogram 102.49 (Annual report on municipal waste of the municipality, 2016). Following the survey, it derives that almost 35% from the total amount of generated waste in the municipality is formed by the recovered waste. The remaining part of waste, i.e. 65% from the total amount of generated waste in the reviewed municipality presents landfilled waste. From the year 2010 the amount of waste disposed by landfilling increased to the level of 5 million tonne in the year 2013 whereby the ratio of waste disposal by landfilling exceeds the level 50% in the waste management (Programme of waste management in the SR for the years 2016-2020, 2015). The disposal of waste by landfilling presents the negative trend in the waste management which needs to be eliminated in every municipality. As regards a low dynamics of sorted waste in the prior period it is indispensable to observe the level of sorted waste each year and in case of negative development to adopt immediate measures for its support (Programme of waste management in the SR for the years 2016-2020, 2015).

Emphasizing the environmental protection as well as the increase in tax revenues it is advisable recommended decreasing of the landfilling level and increasing of the waste recovery. One of the manners is presented by the increase in the local fee rate for municipal waste and minor construction waste. The active information campaign focused on the environmental protection and waste sorting could be an inseparable part of measures.

Acknowledgement

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INFORMATION STORAGE - GREAT CHALLENGE OF MANKIND

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Abstract

Humanity has long sought to store information. The development of the digital economy and society requires quick access to and the storage of information. A static system (library-like storage) is no longer sufficient for the storage and processing of the increased amount of information, but dynamic processing is required which can be achieved with computers. Development calls for digital literacy, which must be interpreted as one of the most important knowledge of the emerging generations. For those who cannot keep pace in this field the world will soon become unliveable. The spread of computers multiplies human opportunities. Nowadays, we do not yet see clearly where the presented processes lead, but their significance in development is indisputable. The generation currently growing up already lives in the digital world, and the world will certainly change in this direction. We must increase our knowledge in this field to be able to cope with the challenges. The rapid growth in the capacity of data storage devices is the result of the increased competition and further success can be expected.

Keywords: *information, innovation, digital economy, data storage, data processing*

JEL classification: *032*

1   Introduction

Throughout history the question of how mankind should handle the accumulated amount of information is raised again and again.

The Big Data phenomenon refers to large amounts of accumulated data in various information systems and the structuring of these data. (CSIZMADIA, 2016).

This phenomenon not only means an increase in the amount of data, but also basically transforms information management. Large databases have three important features:

– the first is the amount of data;
– the second is the diversity of data, the diversity of data types and resources;
– the third property is speed, which is, on the one hand, the speed of data generation and the time available for recovery.

The phenomenon can thus be described by the emergence of rapidly growing and multiplying data masses characterized by enormous variation and complexity, which should be utilized within a short time (BÖGEL, 2011).

Processing huge databases can only be successful if serious technical conditions are met. Data processing is growing in data centres in so-called "cloud computing" (DOCTOROW, 2008; DÖMÖLKI (edit.) 2008).

Today, we are experiencing the industrial revolution of the data, from business life to the scientific life, from state administration to art.

Development is dazzling. It is estimated that by April 2025, as many as 4.4 million data controllers will be required worldwide, of which 1.9 million jobs are expected in the US. The industry grows by 10% a year, twice as fast as the industry as a whole (CSIZMADIA, 2016).

Data and information are therefore appreciated, so the most important resource of the economy is not a physical resource, but people's ability to innovate and adapt in the near future.

The need for the future is to increase the qualification of human resources, and we must strive to achieve it (MAGDA R., 2017).

Today's competitiveness-enhancing trends focus on knowledge, innovation and human resource training. All this means is that we have to think about the measurement options according to the changes (LENGYEL – FENYŐVÁRI, 2010).

The postmodern regional policy seeks to activate the internal resources (regional, social organizational, cultural, environmental, and economic) instead of redeploying resources and exploring new opportunities. The development is conceived by acquiring information, extending knowledge and innovation, and developing contact nets.

Today we have entered the era of the Fourth Industrial Revolution, the age of the robots, leading to an unpredictable future. Innovation and technology are developing very fast. The production of data has been excessively accelerated.

R & D and innovation are the basis of competitiveness. Competitiveness appears in many authors' work (LENGYEL, 1999; BOZSIK, 2003; CSETE – LÁNG,

2005), in which authors find that a universally accepted definition is not yet available.

2   Data and Methods

During this work the development of human resources, the growing role of data storage and future opportunities are examined. The increase in the number of Internet-connected devices is shown by an exponential link. I have completed modelling calculations about what may be expected in the future the results of which will be published in forthcoming publications due to space limit in this paper. The collapse of the system is not yet expected, but in the long run new and innovative ideas need to be put into practice.

Based on literary sources the changes in data volume growth are analysed. On the basis of the results conclusions are drawn and suggestions are made. Relevant data provided by the Hungarian Central Statistical Office (HCSO) is also utilised.

3   Results and Assessment

R & D and innovation include the development of human resources. We are not doing well in this area. Significant changes are also needed in the field of university education to meet the challenges of the future (MAGDA S. et al., 2017).

According to the requirements of the European Union, the Hungarian Central Statistical Office reviews the innovation data of enterprises employing at least 10 people every two years. The scope of data collection has changed recently.

In 2012-2014, 25.6% of the surveyed enterprises implemented some type of innovation (Figure 1).

Figure 1 **Innovative enterprises as a percentage of all enterprises according to the types of innovation**
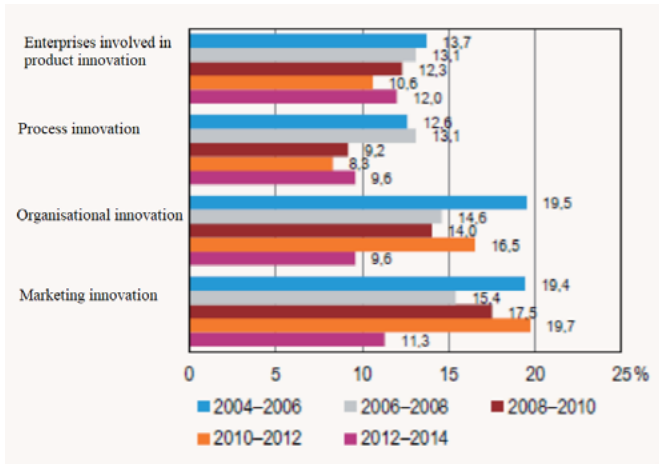
Source: HCSO, 2016.

Employment is mainly provided by SMEs. Well-functioning innovation can greatly improve their position. According to PEREZ (2009), innovation is part of the quality of economic development and can make a significant contribution to growth. Expenditure on R&D in Hungary is not enough, we should strive to achieve the EU target (Figure 2).

Figure 2 **R&D expenditures as the gross domestic product (GDP) percentage**
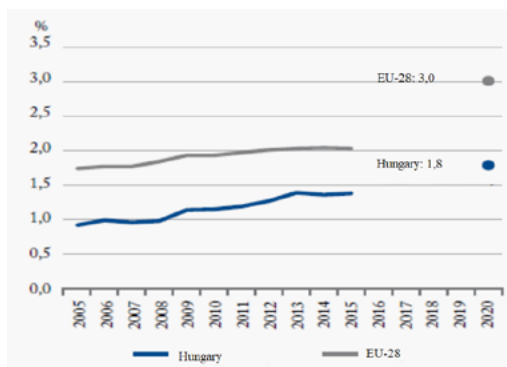
Source: HCSO, 2017.

One of the most important facts today is that the information environment is rapidly changing. There are advantages but also disadvantages. Benefits can be achieved most of all, therefore we do not miss anything and ample data is provided for mathematical analysis, from which we can deduct our conclusions and analyses. Among the disadvantages is the uncertainty created by the rapidly changing environment. Furthermore, the view that there is a great deal of emphasis on the human factor is growing, which provides better protected against non-moral economic activities. The world is currently experiencing the 4th industrial revolution, which seems more significant than the previous ones (Figure 3).

Figure 3 **Industrial revolutions from the classic first industrial revolution to the industrial four**
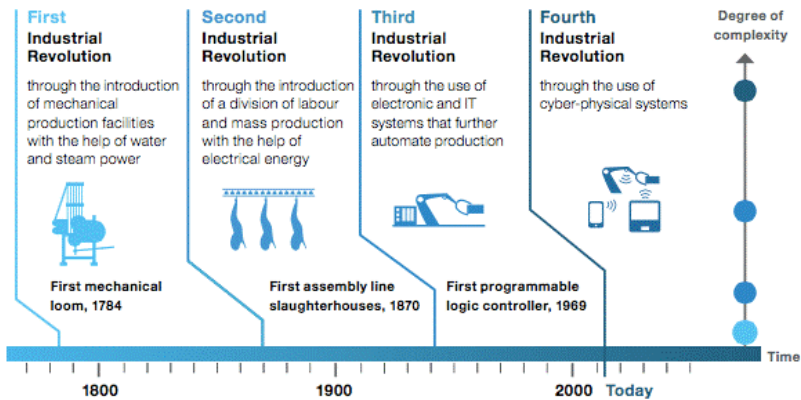
Cyber-physical assistance systems are driving the fourth industrial revolution
Source: Siemens, Pictures of the Future, Spring 2013

Source 1: https://christianmanrique.com/2015/11/04/the-fourth-industrial-revolution-christian-manrique/.

There are four main challenges to data (4V):
– Volume, that is, by 2020 it is expected that up to 40 zettabyte (43 trillion gigabyte) data will be generated;
– Variety, i. e. the different nature and diversity of data;
– Velocity, i. e. the rate of data flow, the New York Stock Exchange uses 1 terabyte of commercial data for each transaction;
– Verocity, i. e. the credibility of the data, one in three businessmen do not trust the information used in decision making.

CSIZMADIA (2016) claims that the American Walmart is carrying out more than a million purchasing trances every hour, producing 2.5 petabytes of information, equivalent to 167 times the total library volume of the US Congress Library.

Diagram 4 shows the enormous development of innovation, especially the technology, as to how much progress has been made in this area. Today, nearly 42 trillion devices have been connected to the Internet. This produces data in a giant way. Today data is much faster generated than previously, as it is no longer stored in physical form, so we can store very large amounts of hard disk space on new hard drives thanks to new data capture technologies.

Figure 4 **The number of devices connected to the Internet is growing exponentially - are we ready for this?**

Source 2: https://www.ncta.com/whats-new/behind-the-numbers-growth-in-the-internet-of-things.
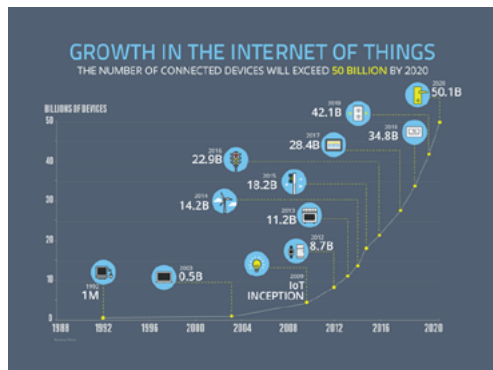
The amount of data production increases exponentially. Most of the data is clearly visible in the corporate sector for continuous monitoring. Of course there are companies here, mainly financial data, and as they are analysed in terms of micro aspects and controlling considerations. Naturally, they continue to fatten the so-called Big Data, which has gained an amazing size by today.

The spread of computers multiplies human opportunities. Nowadays, we do not yet see clearly where these processes lead, but their relevance to development is indisputable. The now-growing generation is already living in the digital world, and the world is shaped in this direction.

Some authors call the "digital gold mines" the potential of producing, processing and using enormous data masses (WATERS, 2011). Instead of the

energy-intensive economy, the opportunities of the "green economy" increase (MAGDA R., 2011). Fast data growth increases storage needs.

The amount of data production exponentially increases. Most of the data is clearly visible in the corporate sector for continuous monitoring. Of course, there are companies here, mainly financial data, and as they are analyzed in terms of micro aspects and controlling considerations. Of course, they continue to fatten the so-called Big Data, which has become an amazing size today. Data on this are shown in Figure 5.

Figure 5 **Increasing demand for storage capacity**

Source 3: https://anandtech.com/show/9866/hard-disk-drives-with-hamr-technology-set-to-arrive-in-2018.
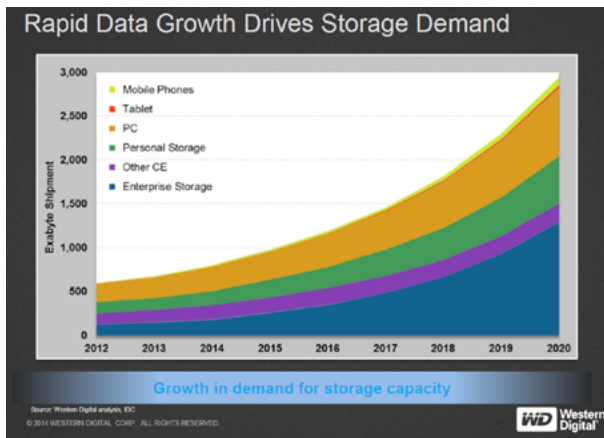
"Big Data" affects the overall corporate environment. Significant processes have started in companies.

It is well-observed that today the growth rate has accelerated to a great extent, nowadays companies may become incorporated within 2-3 years. As a new trend, many of the larger financial investors are concerned about taking a company as soon as possible and then investing in it and investing in another similar opportunity. The question is, of course, whether these processes will dilute the stable business community with unstable ones, but that is another problem and issue that brings about the issue of morality. It is worth taking a look at the most widely used models today (Diagram 6).

Figure 6 **An open innovation model**
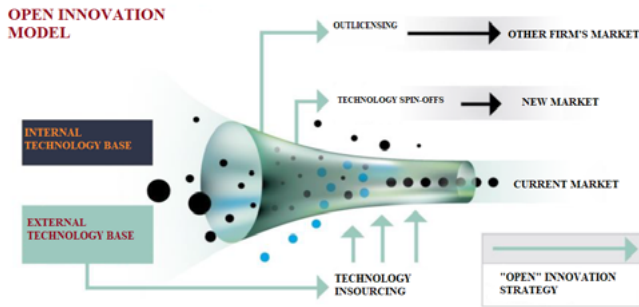
Source: Dőry, 2012.

4   Conclusions

In the course of economic development, we find increasingly better solutions to meet the needs of people. In doing so, the role of information becomes more important while the raw materials are reduced. The value of companies is increasingly attributed to technology, manufacturing processes, technical solutions, descriptions, documentation, and data content, as well as skilled workforce.

The appreciation of the role of data in the economy is inherent in human development. In innovation-driven economies, instead of increasing the amount of production factors, efforts should be made to increase quality.

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Internet source

Source 1: http://bkik.hu/iparitagozat/ipari-tagozat/osztalyok/bkik-vii-hirkozles-informatika-osztaly/vii-osztaly-hirei/ipar-4-0/

Source 2: https://www.ncta.com/whats-new/behind-the-numbers-growth-in-the-internet-of-things

Source 3: https://anandtech.com/show/9866/hard-disk-drives-with-hamr-technology-set-to-arrive-in-2018

TRANSFER PRICING IN THE SLOVAK REPUBLIC AND ITS COMPARISON TO OTHER COUNTRIES OF THE VISEGRAD GROUP

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Abstract

The issue of transfer pricing presents the crucial area of legal arrangements of income tax and is the subject of dynamic development in the global but as well as in the national scale.Recently the transfer pricing has become the central theme for both tax administrators and taxpayers in the Slovak Republic. The paper's aim is to assess the issue of transfer pricing in the Slovak Republic and compare the selected attributes of transfer pricing with other countries of the Visegrad Group.The theoretical research has been applied for reaching the paper's aim.It can be stated that the Slovak Republic altogether with other countries of the Visegrad Group respects the rules arising from the OECD Guidelines in the area of transfer pricing between related parties, while the concrete methods of application of the arm's length principle and the obligation of keeping the documentation on transfer pricing are anchored in the particular legal arrangements as regard the income tax.

Keywords: *arm´s length principle, documentation, related parties, transfer pricing, V4 countries*

JEL classification: *H25, H71, M41*

1 Introduction

By the entrance of Slovakia into the European Union (EU) the Slovak market became the part of the unified market of the EU member states. The protection

in form of customs and administrative restrictions was abolished and the market became global and integrated (Tóth et al., 2016). Ongoing internationalization and permanently growing world globalization processes shape the market and influence business activities, demands and needs of enterprises (Országhová et al., 2016; Babčanová et al., 2012). The development of the regulatory framework of markets, technical and organizational innovations, and new societal and consumer perceptions in integrated Europe, have changed the business context and the determinants of corporate success (Pakšiová, 2016). Globalization allows for reallocation of sources of production resources, including work, on international scale depending on their price and availability. Development of relationships between economies, growth of liberalisation and integration of trade markets, cooperation of regional blocs, such as European Union, affect conditions of running business activity (Skórska, 2016). One of the practical phenomena of globalization is the creation of international companies. One of the most crucial international tax questions to which international companies are exposed is the transfer pricing.

The issue of transfer pricing is an important factor affecting tax incomes of individual countries (Brabec & Hasprová, 2016). Transfer pricing is the phenomenon by which related corporate entities in different jurisdictions determine the price at which a transfer of goods or services between those two entities should be deemed to have occurred. This phenomenon is an inherent and endemic part of the international trading system (Bastin, 2014). Transfer pricing is employed as a profit allocation strategy to attribute a multinational corporation's net profit before tax when crossing international borders (Clempner & Poznyak, 2017). High transfer prices for sales of goods to affiliates in high-tax countries are used to repatriate profits to low-tax countries, thereby reducing the over-all tax burden (Behrens, Peralt & Picard, 2014; Usmen, 2012). Transfer prices play an important and strategic role on income shifting by multinational companies (Wang, Gao & Mukhopadhyay, 2016). Transfer price taxation is a system that tries to protect the domestic tax authority and to prevent international tax evasion (Cho & Park, 2015).

2   Data and Methods

The paper's aim is to assess the issue of transfer pricing in the Slovak Republic and compare the selected attributes of transfer pricing with other countries of the Visegrad Group. The theoretical research has been applied for reaching the paper's aim. Basic input materials are following legal norms except for professional literature:

- OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations,
- Act No. 595/2003 Coll. on Income Tax with the latest amendments (hereinafter referred to as "Income Tax Act"),
- Regulation of the Ministry of Finance of the Slovak Republic No. MF/014283/2016-724 on determination of documentation content pursuant to the Article 18 par. 1 of the Income Tax Act,
- Methodical instruction of Financial Directorate of the Slovak Republic to the application of transfer pricing methods.

Generally accepted basic research methods have been applied in the paper's processing which lead to the achievement of scientific knowledge in relation to the before mentioned issue.

3   Results and Discussion

3.1   Transfer pricing in the Slovak Republic

The beginnings of legislation amendments of transfer pricing in the Slovak Republic reach the period of the Slovak Republic establishment. The Act No. 286/1992 Coll. on Income Tax contained the provisions pursuant to which an income tax base of related parties was adjusted by differences to which prices between related parties differentiated from prices used between unrelated parties. The range of legal arrangements of related parties has gradually extended what was disclosed in the new Act No. 366/1999 Coll. on Income Tax. The national legal arrangements of transfer pricing in the Slovak Republic has always been influenced by the international legal arrangements, namely the OECD Guideline on Transfer Pricing for Multinational Enterprises and Tax Administrations and documents adopted at the level of the European Union. The influence of international legal arrangements was fully displayed by the adoption of actual valid Act No. 595/2003 Coll. on Income Tax with the latest amendments. This Act presents the essential legal norm adjusting the transfer pricing in the Slovak Republic.

The arm's length principle presents the base of transfer pricing. It is defined in the Article 18 par. 1 of the Income Tax Act. It is based on the comparison of conditions set in business or financial relationships between related parties with the conditions which would be agreed between unrelated parties in comparable business or financial relationships under comparable circumstances. The arm's length principle allows tax administrator to adjust the tax base of related party to a difference which occurs when the prices in transactions differentiate from the prices

in comparable transactions between unrelated parties under comparable circumstances.

Related party is defined quite extensively by the Income Tax Act. Related party is a domestic or foreign close person pursuant to the Civil Code, or economically, personally or another affiliated party. Economical or personal relationship means:

1. A person's share in property, control or management of another person. The share in property or control means more than 25 % of direct or indirect share or indirect derived share in share capital or voting rights. If the amount of indirect derived share exceeds 50 %, all parties by means which the amount is calculated, are economically related regardless their real amount of share. The participation in management means the relationship of statutory members or members of supervisory board of commercial companies or cooperatives to this commercial company or cooperative.

2. The mutual relationship between parties which are under control or management of the same party or in which this party has direct or indirect share in property.

Pursuant to the Income Tax Act another relationship is defined as a business relationship created mainly for the purpose of tax base decrease or increase of tax loss.

The subject of transfer pricing are transactions of related parties, marked as controlled transactions. The price is the subject of a controlled transaction, is marked as a transfer price. Transactions realized between unrelated/independent parties present unrelated transactions. Controlled transactions are compared with uncontrolled transactions while only those transactions might be compared which have all economically crucial comparable features.

Methods of transfer pricing present the manner how to calculate a difference to which prices differentiate in the mutual business relationships between related parties from prices used between unrelated parties in comparable business relationships. The Slovak Republic has adopted the methods of transfer pricing pursuant to the Directive on transfer pricing which are based on the comparison of price (traditional transaction methods) and the comparison of profit (transactional profit methods). The Income Tax Act allows the mutual combination of before mentioned methods, respectively allows the selection of another method which is not defined in the Income Tax Act and the Directive on transfer pricing. The condition is to use another method which shall be in conformity with the arm's length principle.

Traditional transaction methods derive from the price comparison of goods or services which are the subject of controlled transaction between related parties.

a) The Comparable Uncontrolled Price Method compares the price charged for property or services transferred in a controlled transaction to the price charged for property or services transferred in a comparable uncontrolled transaction in comparable circumstances. The Comparable Uncontrolled Price Method may also sometimes be used to determine the arm's length royalty for the use of an intangible asset.

b) The Resale Price Method is one of the traditional transaction methods that can be used to determine whether a transaction reflects the arm's length principle. The Resale Price Method focuses on the related sales company which performs marketing and selling functions as the tested party in the transfer pricing analysis.

c) The Cost Plus Method is used to analyse transfer pricing issues involving tangible property or services. It is typically most applied to manufacturing or assembling activities and relatively simple service providers. The Cost Plus Method focuses on the related party manufacturer or service provider as the tested party in the transfer pricing analysis. The method evaluates the arm's length nature of an intercompany charge by reference to the gross profit mark--up on costs incurred by suppliers of property (or services) for tangible property transferred (or services provided). It compares the gross profit mark-up earned by the tested party for manufacturing the product or for providing the service to the gross profit mark-ups earned by comparable companies.

The transactional profit methods derive from the profit comparability arising from a controlled transaction. The application of transactional profit methods is appropriate in case there is not a sufficiency of reliable data at disposal for the analysis of comparability in traditional transaction methods.

a) The Profit Split Method is typically applied when both sides of the controlled transaction contribute significant intangible property. The profit is to be divided such as is expected in a joint venture relationship. The Profit Split Method seeks to eliminate the effect on profits of special conditions made or imposed in a controlled transaction (or in controlled transactions that it is appropriate to aggregate) by determining the division of profits that independent enterprises would have expected to realize from engaging in the transaction or transactions.

b) The Transactional Net Margin Method compares the net profit margin (relative to an appropriate base) that the tested party earns in the controlled transactions to the same net profit margins earned by the tested party in comparable uncontrolled transactions or alternatively by independent comparable com-

panies. This method is used to analyse transfer pricing issues involving tangible property, intangible property or services.

Uniform rules do not exist when applying individual methods of transfer pricing which would be appropriate and applicable in each situation. The selection of particular method is the result of compromise while it is necessary to take into account a possible method inaccuracy, prioritize a higher level of comparability and a tighter relation to a transaction. The application of selected transfer pricing method shall be announced to a tax administrator by a taxpayer, while a taxpayer is obliged to demonstrate and justify the submission of transfer pricing documentation.

A taxpayer might ask a tax administrator for a decision on approval of a particular transfer pricing method before performing a transaction with a related party. Therefore a taxpayer can confirm whether his proposed procedure of transaction pricing is in accordance with the arm's length principle. The decision on approval of the transfer pricing method may be issued for up to five tax years (with a possibility of prolongation if the terms are not changed).

In case of controlled transactions each related party is obliged to keep the documentation on used method of transfer pricing. The documentation presents the file of information, data and facts presenting and explaining the procedure of price creation in controlled transactions. The minimal range of documentation is limited by the Measure of the Ministry of Finance of the Slovak Republic No. MF/014283/2016-724 on determination of documentation content pursuant to the Article 18 par. 1 of the Income Tax Act.

From the point of required data range the following types of documentation is recognized: reduced, basic and full documentation. Each of the before mentioned documentation is fully determined for a precise group of taxpayers who are obliged to keep a particular documentation. Taxpayers natural persons and taxpayers who are micro-accounting entities pursuant to the Act No. 431/2002 Coll. on Accounting with the latest amendments keep the documentation minimally in range of reduced documentation. The possibility to keep the reduced documentation relates as well as to the selected subjects of public administration but only for some controlled transactions. The same is applied in case of transactions between domestic related parties, it is sufficient to keep the reduced documentation as regards domestic controlled transactions. The possibility to keep the reduced documentation is assessed positively as regards the Articles of OECD Guideline on transfer pricing pursuant to which the interstate requirements on documentation content should not cause inappropriate burden to taxpayers.

3.2 Comparison to other countries of the Visegrad Group

Retaining tax revenue is a major driver of fiscal policy formulation in the countries of the Visegrad Group as it is throughout the world. Thus, transfer price regulations appearing in the tax systems of all countries of the Visegrad Group are compared in the following table 1.

Table 1 **Comparison of the selected attributes of transfer pricing to other countries of the Visegrad Group**

Transfer Price Regulations	The Countries of the Visegrad Group			
	Slovakia	**Czech Republic**	**Hungary**	**Poland**
Arm´s length principle	since 1999	since 1993	since 1996	since 1997
Legislation	Income Tax Act No. 595/2003 Coll; Double Tax Treaties.	Income Taxes Act No. 586/1992 Coll; Double Tax Treaties.	Act LXXXI of 1996 on Corporate Income Tax; Act XCII on Taxation; Act CXXVII on VAT; Double Tax Treaties.	Corporate Income Tax Act From February 15th, 1992; Personal Income Tax Act From July 26th, 1991; Double Tax Treaties.
Controlled parties	Domestic and cross-border related parties.	Domestic and cross- border related parties.	Domestic and cross-border related parties; branches and head offices; entities having common directorship	Domestic and cross-border related parties.
Related parties	25 % < direct or indirect control or common managing director or other control aimed purely on circumvention of tax	25 % < direct or indirect control or personally related	50 % < direct or indirect control or common managing director	25 % < direct or indirect control personal, family relations

Transfer Price Regulations	The Countries of the Visegrad Group			
	Slovakia	Czech Republic	Hungary	Poland
Applicable transfer pricing (TP) methods	Traditional transaction methods and transactional profit methods according to OECD TP Guidelines (the principle of the best method applies).	Traditional transaction methods and transactional profit methods according to OECD TP Guidelines (the principle of the best method applies).	Traditional transaction methods and transactional profit methods according to OECD TP Guidelines.	Traditional transaction methods according to OECD Guidelines are preferred over transactional profit methods.
Documentation liability	since 2009	since 2006	since 2003	since 2001
Subjects obliged to keep the documentation	Taxpayers engaged in transactions with related parties.	Taxpayers engaged in transactions with related parties.	Taxpayers engaged in related party transactions with the exception of small and medium sized companies as defined by the Act on Corporate Income Tax (individuals are outside the scope).	Taxpayers engaged in transactions with related parties. Entities performing transactions with "tax havens".

Continue the table 1

Transfer Price Regulations	The Countries of the Visegrad Group			
	Slovakia	Czech Republic	Hungary	Poland
Simplified documentation	Yes, as option for selected taxpayers e.g. individuals, small and medium entities, and if certain conditions are met.	Yes, simplified documentation as an option but only for selected transactions.	Yes, for low value adding services if certain conditions are met.	Taxpayers with revenues or costs > 10.000.000 Eur are obliged to attach to the tax return a simplified report on transactions carried out.
Advance Pricing Agreement (APA)	since 2004	since 2006	since 2007	since 2006
Penalties	No specific TP penalties, but adjustment of tax base plus penalties. For non-compliance with the TP documentation obligations a penalty up to 3.000 Eur.	No specific TP penalties, but adjustment of tax base plus penalties and interest for late payment.	If the TP modification results in tax shortage: 50 % tax penalty and late payment interest penalty. Failure to present appropriate TP documentation: penalty up to 2.000.000 HUF per transaction.	If the revenue is evaluated by tax authorities in the amount higher than declared by the taxpayer, and the taxpayer does not submit the required TP documentation – the difference between previous and evaluated amount is taxed 50 % tax rate. Possible responsibility under penal-fiscal code.

Transfer Price Regulations	The Countries of the Visegrad Group			
	Slovakia	Czech Republic	Hungary	Poland
Safe harbours	Not officially published/ accepted- but generally accepted. Low value added services 3-10 % mark-up.	Low value added services 3-7 % mark-up.	Low value added services 3-10 % mark-up.	X
Country-by-Country Reporting	Rules implemented with effect from March 1st, 2017.	Rules implemented with effect from September 19th, 2017.	Rules implemented with effect from May 31th, 2017.	Rules implemented with effect from January 1st, 2016.
Level of attention paid by Tax Authority	9/10	9/10	9/10	10/10

Source: Own processing according to Mazars CEE Tax Guide 2017 and Accace Transfer Pricing CEE Overview 2017.

In the Visegrad Group countries the issue of transfer pricing is amended by particular legal arrangements related to the income tax. The rules of transfer pricing relate to foreign as well as domestic related parties in all before mentioned countries. In the Slovak Republic the obligation to evaluate transaction on the arm's length principle referred only to foreign related parties till the end of 2014. Effective since 1 January 2015 the rules of transfer pricing has been spread also to domestic related parties. With effect starting January 1st, 2017, the capital threshold to qualify as a related party increased from 5 % to 25 % in Poland. Thus, transactions between entities holding less than 25 % shares (directly or indirectly) are not covered by documentation obligation. In Hungary, the Hungarian head office and the foreign PEs/branches, as well as the Hungarian PEs/branches and the foreign head office qualify as related parties. Thus, the transfer pricing rules also apply to these enterprises. Furthermore, the definition of related parties was amended as of January 1st, 2015. As a result of the changes, the concept of common directorship was added to the definition. Thus, even if the ownership (voting) rights of one entity in another entity do not exceed 50 %, but the entities in question have the same management, then the two entities are considered related parties and are subject to the obligations prescribed by transfer pricing rules.

In the before mentioned countries including the Slovak Republic all taxpayers keep the transfer documentation as they perform transactions with domestic or foreign related parties. Generally, there is no legal obligation to prepare transfer price documentation in the Czech Republic. However, the taxpayer is required to provide documentary evidence of all facts which he is obliged to state in his tax return or other communication with the tax administration. In this context, the taxpayer may be requested to prove how the transfer prices in its related-party transactions were determined, and whether they comply with the arm's length principle. In Poland except for taxpayers performing transactions with domestic or foreign related parties it relates to those taxpayers who perform transactions with so called tax havens. Polish taxpayers whose revenues do not exceed 2.000.000 Eur in a given year have no obligation to prepare transfer pricing documentation. In Hungary the exceptions are presented by small and medium-sized enterprises and cases, when the transaction was made based on agreement with and individual. The possibility of creation of simple transfer pricing documentation is allowed in all the V4 countries for the selected subjects, transactions or meeting of certain conditions.

In the all Visegrad Group countries the acceptable methods of transfer pricing are those pursuant to the OECD Guidelines. In the Slovak Republic and the Czech Republic the traditional transaction methods can be used as well as transactional profit methods of transfer pricing while the principle of the most advantageous method is applied. Hungary does not establish priority of methods as well – the traditional transaction and transactional profit methods are equal. If the arm´s length price cannot be supported by the methods according to OECD Transfer Pricing Guidelines, other methods shall be applied. The traditional transaction methods are preferred over transactional profit methods in Poland. When the transfer price is determined by the tax authorities, the comparable uncontrolled price method is applied in the first instance. If a taxpayer has determined the arm's length value of a transaction by applying one of the three standard methods and there is no doubt about the objectivity in choosing the method, this method is also binding for the tax authorities. Even in the Slovak Republic recently the usage of traditional transaction methods has been preferred before the transactional profit methods. This hierarchy in the application of transfer pricing methods has been eliminated by the amendment of the Income Tax Act effective since 1 January in accordance with the current version of the OECD Guidelines.

The news in the area of transfer pricing is so called the country-by-country reporting. As at 28 January 2016 the Slovak Republic signed a document on automatic change of information, so called the country-by-country reporting together with other thirty countries within the thirteenth measure for action plan

of transfer pricing. The rules of country-by-country reporting relate to the large multinational groups with consolidated annual turnover exceeding 750 million Eur. The obligation of such companies is to report on an annual base the information relevant for financial administration in a given state. Individual tax offices will subsequently change these information on global allocation of income, profit, capital, employees, assets or information on paid taxes. Through the rules of country-by-country reporting it should be easier for tax offices to reveal the inaccuracies in prices of international companies and as well as the related tax evasions. The country-by-country reporting was firstly implemented in Poland within the countries of the Visegrad Group, namely in the year 2016. In other countries of the Visegrad Group the rules of the country-by-country reporting were implemented within the year 2017, for the last time in September in the Czech Republic.

4   Conclusion

The transfer pricing is still more discussed issue in the world, as well as in Slovakia, where every year the number of tax controls is growing due to this area. The transfer pricing relates to the transactions realized between related parties which may be influenced by mutual relations of these parties. If the prices applied in the transactions of related parties are not comparable with the prices which shall be used by unrelated parties in comparable transactions, the tax evasions can occur. In order to avoid the tax evasions the rules of transfer pricing are applied in the majority of countries including the countries of the Visegrad Group. The rules of transfer pricing in such countries derive from the principles set in the OECD Guideline for Transfer Pricing for Multinational Enterprises and Tax administrations.

The Article deals with the assessment of national legal arrangement of transfer pricing in the Slovak Republic. The relevance of transfer pricing in Slovakia has increased in the last years also as regards the amendments in the Slovak legal arrangement which determines the obligation to keep the documentation on applied method of transfer pricing not only for foreign related parties but as well as for domestic related parties. The selected attributes of national legal arrangement were compared with the legal arrangement of transfer pricing in other countries of the Visegrad Group. In conclusion it can be stated that the Slovak Republic altogether with other Visegrad Group countries respects the rules arising from the OECD Guidelines in the area of transfer pricing between related parties, while the concrete methods of application of the arm's length principle and the obligation

of keeping the documentation on transfer pricing are anchored in the particular legal arrangements as regard the income tax.

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ASSESSING OF COST PRICE OF MILK AT SLOVAK MILK PROCESSORS

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Abstract

The diary sector represents one of the most important branches of agriculture and food industry in the Slovak Republic. The period of year 2015-2016 is referred to as the period of the middle milk crisis.The ban on imports of agricultural products from the European Union into the Russian Federation andthe abolition of milk quota regime in the European Union in 2015 caused the enormous surpluses of milk at the European market. The high surpluses of milk led to the decrease in the purchase prices of milk.The article's task is to assess and present the development of purchase prices of cow's milk at processors in the Slovak Republic in the observed period 2015-2017.The essential information sources are presented by monthly reports on purchase of milk and cream and production of milk products acquired from the Ministry of Agriculture and Rural Development of the Slovak Republic. In 2017 the development of average purchase prices of raw cow's milk was auspicious in comparison with the development of these prices in years 2015-2016. The average purchase price of raw cow's milk with the whole year 2017 continuouslyrose.

Keywords: *cow´s milk, milk crisis, price, processor, purchase*

JEL classification: *Q10, Q11, Q13*

1 Introduction

According to Lajdová, Kapusta and Bielik (2017) the diary sector represents one of the most important branches of agriculture and food industry in the Slovak Republic. However, the sector is losing its scope continuously, also production is

diminishing and moreover it faces several problems affecting the sector (EU milk quota regime has come to an end in 2015, a drop in prices paid to producers and the increase in the cost of animal feeding, etc.). The milk production is important for the society as a whole, both in terms of economy of state and the employment of rural population. It is a traditional economic sector that due to its very favourable conditions promises a very viable future (Gurčík, Dobošová, Richter, Kubicová & Dobák, 2016). For the past 17 years, consumption of milk, except cheese, cottage cheese, sour milk products and butter, decreased. Expressed by linear regression model in recent years (since 1995) in Slovakia occurred overall reduction in the consumption of milk and dairy products by an average of 0.988 kg per capita per year. This development was mainly conditioned by the annual descent of demand for milk, as its consumption with little variation in average decreased annually by up to 1,88 kg per capita. This development is largely due to the increase of milk prices and especially the increasing supply of a wide range of quality and flavoured sour milk and cheese products (Kubicová & Habánová, 2012).

The production of milk is organizationally, materially, economically and in focus of manpower deployment the most demanding livestock sector. Reasons of the cost items fluctuation are mainly different natural, productive, organizational and other conditions. Other reasons are different individual cost items registrations; variability in determination of biological indicators and in some cases the inaccuracy or inability of their exact findings (Bouška et al., 2006). The relationship between the producers, wholesale and retail prices provides insights into the marketing channel efficiency and the degree of market competition. The milk pricing system in Slovakia has stimulated a public debate on the milk price formation and on the price transmission along the milk marketing channel (Weldesenbet, 2013). The retailers face the surplus of food products as the farmers are not able to export their products production and at the same time they face the offer of cheaper products by foreign producers which results in an extensive import (Kita, Máziková, Grossmanová & Kita, 2012). The milk prices in diary industry within the food vertical from in the territory of Slovakia is developed also by Kadlečíková, Kapsdorferová, Filo and Malejčíková (2012), Brodová (2013), Matošková and Gálik (2014), Božík, Uhrinčaťová, Chrastinová and Krížová (2016).

2   Data and Methods

The article's task is to assess and present the development of purchase prices of cow's milk at processors in the Slovak Republic in the observed period based on the selected literature sources. The essential information sources for the processing

of before mentioned issue are presented by monthly reports on purchase of milk and cream and production of milk products acquired from the Ministry of Agriculture and Rural Development of the Slovak Republic (hereinafter referred to as "MARD SR"). The purchase prices and the number of purchased milk from producers are represented for the assessed period of year 2017. The average purchase price of raw cow's milk in the Slovak Republic is treated in the years 2015-2017. The assessment of purchase price of milk can contribute to the identification of price transfers and margins and their influence in the change of prices of milk food what is simultaneously presented in expenses for food. The basic methodical approach of processing in a theoretical as well as in a practical level is presented by standard methods of scientific work such as selection, analysis, comparison, deduction and synthesis.

3　　Results and Discussion

Table 1 **Purchase prices and amount of purchased milk from producer in the 1st half of the year2017 (prices are stated in EUR/100 kg without VAT)**

Product	Amount/price	January	February	March	April	May	June
Raw cow's milk, Q. class	Amount (t)	52 878	48 538	52 997	48 190	47 556	43 889
	Min. price	24,27	24,26	24,27	24,26	24,82	24,90
	Max. price	34,00	35,23	34,66	35,90	36,46	37,75
	Avg. price	**29,33**	**29,62**	**29,69**	**30,06**	**30,09**	**30,30**
Raw cow's milk, 1st class	Amount (t)	14 937	15 063	19 014	22 562	25 868	26 168
	Min. price	22,16	27,33	26,83	22,73	25,95	25,78
	Max. price	30,93	33,66	32,62	33,59	31,59	32,28
	Avg. price	**28,70**	**29,37**	**29,29**	**29,34**	**29,58**	**29,72**
Raw cow's milk, non-standard	Amount (t)	556	543	1 174	880	907	1 189
	Min. price	11,30	13,35	11,28	11,28	11,29	11,43
	Max. price	28,32	29,12	29,61	42,55	29,50	29,50
	Avg. price	**24,51**	**24,16**	**24,78**	**27,21**	**25,28**	**24,92**
Raw cow's milk total	Amount (t)	68 371	64 144	73 185	71 632	74 331	71 246
	Fat cont. %	3,96	3,87	3,74	3,73	3,70	3,65
	Protein cont. %	3,44	3,39	3,32	3,33	3,31	3,27
	Min. price	24,27	24,26	24,27	23,13	27,07	26,96
	Max. price	34,00	34,44	33,98	33,98	34,46	35,93
	Avg. price	**29,15**	**29,52**	**29,51**	**29,79**	**29,86**	**29,99**

Source: Monthly reports on purchase of milk and cream and production of milk products (MARD SR).

In January 2017 more raw cow's milk was purchased in comparison with December 2016 while the average purchase price was stable at the level of 29,15 EUR/100 kg. In January the processors purchased altogether 68 371 tonne of raw cow's milk what presented the increase by 3,2 % between months. Thereof the majority (77,3 %) of Q. class milk was purchased, the 1st class milk presented 21,8 % of January purchase and non-standard milk participated only by 0,8 %. In January the average purchase price of milk increase by 3,1 % to the level of 29,15 EUR/100 kg in comparison with December 2016. Mostly the price of non-standard milk increased, almost by 19,4 %. In comparison with January 2016 the average purchase price of raw cow's milk was higher by 6,1 %.

The increase in milk purchase price continued as well as in February and the price was confirmed at the level 29,52 EUR/100 kg. The processors purchased 64 144 tonne of raw cow's milk, presenting the decrease by 6,2 % in comparison with the prior month. Year on year the processors purchased less by 6,8 % than in February 2016. As regards the year on year development of prices the average purchase price increase by 1,2 % while mostly the purchase price of the 1st class milk increased and the price of non-standard milk decreased. In comparison with February 2016 the average purchase price of raw cow's milk was higher by 9,9 %. Year on year the purchase prices of individual quality classes of milk increased from 9,5 % till 13,3 %.

In March more raw cow's milk was purchased in comparison with February but the price was slightly weakened at the level of 29,51 EUR/100 kg. The processors purchased 73 185 tonne of milk what presented the increase by 14,1 % in comparison with February. The amount of purchased non-standard milk increased by 116,2 %. Year on year the processors purchased less of raw cow's milk the decrease by 1,6 %. In March the average purchase price of milk stayed at the level of 29,51 EUR/100 kg. Comparing the prior's year March the average purchase price was higher by 14 %. Year on year the increase from 13,9 % till 22,1 % was disclosed for all individual quality classes.

In April the amount of purchased milk was lower in comparison with March while the purchase price slightly increased. In April the processors purchased 71 632 tonne of milk from producers what presented the decrease by 2,1 % in comparison with March. As well as in the annual comparison the decrease of purchased amount of milk was presented altogether by 1,9 %, while the highest decrease was reported by the amount of non-standard milk (58,5 %). In April the average purchase price of milk slightly increased by 1 % at the level of 29,79 EUR/100 kg in comparison with the prior month. Year on year the average purchase price of raw cow's milk increased almost by 20,5 %. In comparison with

April 2016 the purchase prices of individual quality classes of milk increased from 19,0 % till 31,2 %.

In May the purchase of raw cow's milk was higher than in April and its purchase price slightly increased. The processors purchased 74 331 tonne of raw cow's milk presenting the increase by 3,8 % in comparison with April. In the annual comparison the purchase of milk was higher only by 0,4 % than in May 2016. The average purchase price of milk slightly increased at the level of 29,86 EUR/100 kg what presented the increase only by 0,2 % in comparison with April. When comparing the purchase prices of milk with May 2016 the average purchase price of raw cow's milk was higher by 26,1 %. The purchase prices of individual quality classes of milk increased from 26,2 % till 34,1 %.

In June the decreased in the amount of purchased milk was reported in comparison with May nevertheless the purchase price of milk slightly increased. In June the processors purchased 71 246 tonne what presented the decrease by 4,2 % than in May. Annually the processors purchased altogether more than 3,3 % of raw cow's milk. The purchase of Q. class milk annually decreased by 12,4 % but the purchase of 1st class milk was higher by 43,7 % than in June 2016. In June the average purchase price of raw cow's milk increased only slightly by 0,5 % at the level of 29,99 EUR/100 kg. In comparison with June 2016 the average purchase price of raw cow's milk was higher by 29,5 %. The purchase price of individual quality classes annually increased from 29,8 % till 34,6 %.

Table 2 **Purchase prices and amount of purchased milk from producer in the 2nd half of the year2017 (prices are stated in EUR/100 kg without VAT)**

Product	Amount/ Price	July	August	September	October	November	December
Raw cow's milk, Q. class	Amount (t)	41 695	35 265	35 093	39 573	42 103	47 640
	Min. price	28,34	25,67	26,77	26,58	28,25	26,20
	Max. price	36,45	36,82	37,04	37,84	38,68	39,21
	Avg. price	**30,80**	**31,26**	**32,14**	**33,34**	**33,90**	**34,11**
Raw cow's milk, 1st class	Amount (t)	28 310	31 511	28 782	25 418	20 633	19 281
	Min. price	21,35	21,37	21,35	21,36	21,35	29,13
	Max. price	32,12	34,59	34,33	35,10	35,16	39,90
	Avg. price	**30,28**	**30,73**	**31,89**	**32,80**	**33,20**	**33,79**
Raw cow's milk, non-standard	Amount (t)	1 899	1 643	1 886	932	757	744
	Min. price	9,72	9,70	11,96	11,34	11,43	11,28
	Max. price	30,00	30,50	43,03	32,04	34,02	33,02
	Avg. price	**26,87**	**27,01**	**30,00**	**28,51**	**28,75**	**29,90**

Product	Amount/ Price	July	August	Sep- tember	Octo- ber	Novem- ber	Decem- ber
Raw cow's milk total	Amount (t)	71 904	68 419	65 761	65 923	63 492	67 485
	Fat cont. %	3,63	3,61	3,70	3,84	3,90	3,93
	Protein cont. %	3,25	3,27	3,37	3,44	3,48	3,48
	Min. price	21,35	21,37	21,35	21,36	21,35	26,20
	Max. price	35,93	36,20	36,59	37,84	38,68	39,22
	Avg. price	**30,49**	**30,91**	**31,97**	**33,06**	**33,61**	**33,97**

Source: Monthly reports on purchase of milk and cream and production of milk products (MARD SR).

In July the purchase price of milk still increased at the same way as the amount of purchase raw cow's milk in comparison with June. The 71 904 tonne of raw cow's milk was purchased presenting the increase by 0,9 % in comparison with June. In the annual comparison the processors purchased more than 3,4 %. In July the average purchase price of milk slightly increased by 1,7 % at the level 30,49 EUR/100 kg. In comparison with July 2016 the average purchase price of raw cow's milk was higher by 31,9 %. In comparison with July 2016 the purchase price of individual quality classes of milk annually increased from 31,7 % till 43,6 %.

The increase of purchase price of milk continued as well as in August and the price increased at the level of 30,91 EUR/100 kg. The processors purchased 68 419 tonne of raw cow's milk disclosing the decrease by 4,9 % than in the prior month. In the annual comparison the processor purchased more than 1,2 % more of raw cow's milk than in August 2016. As regards the development of prices between months the average purchase price increased by 1,4 %. In comparison with August 2016 the average purchase price of raw cow's milk was higher by 32,2 %. The purchase prices of individual quality classes of milk annually increased from 31,9 % till 46,8 %.

In September the amount of purchased raw cow's milk was lower than in August but the purchase price of milk increased again. The processors purchased 65 761 tonne of milk what presented the decrease by 3,9 % than in August. Annually the processors purchased altogether more than 4,8 % of raw cow's milk. In September the average purchase price of milk increased almost by 3,4 % and reached the level of 31,97 EUR/100 kg. In comparison with September of prior year the average purchase price of raw cow's milk was higher by 32,1 %. As regards individual quality classes of milk the increase of purchase prices was reported from 30,5 % till 54,3 %.

In October the amount of purchased milk was higher while the purchase price further increased. In October the processors purchased 65 923 tonne from producers what presented the increase by 0,3 % than in September. In the year on year comparison the increase in the amount of purchased milk was by 13,4 %. In October the average purchase price of milk increased from 3,4 % at the level of 33,06 EUR/100 kg in comparison with the prior month. Annually the average purchase price of raw cow's milk increased by 28,2 %. In comparison with October 2016 the purchase prices of individual classes of milk increased from 28,3 % till 48,0 %.

In November the amount of purchased raw cow's milk was lower than in October and its purchase price increased. The processors purchased 63 492 tonne of raw cow's milk what was less by 3,7 % in comparison with October. In the year on year comparison the amount of purchased milk was altogether higher by 2,2 % than in November 2016. In November the average purchase price of milk increased at the level of 33,61 EUR/100 kg, what presented the increase by 1,7 % in comparison with October. When comparing the purchase prices of milk with November 2016 the average purchase price of raw cow's milk was higher by 24,3 %. The purchase price of individual quality classes of milk annually increased from 24,5 % till 33,2 %.

In December the increase in the amount of purchased milk was reported in comparison with November as well as the purchase price of milk increased. In December the processors purchased 67 45 tonne of raw cow's milk what was higher by 6,3 % than in November. Year on year the processors purchased altogether more of raw cow's milk, the increase by 1,9 %. Nevertheless the purchase of Q. class milk annually decreased by 10,9 % but the amount of purchased 1st class milk increased almost by 52,0 % than in December 2016. The average purchase price of raw cow's milk increased by 1,1 % at the level of 33,79 EUR/100 kg in December. In comparison with December 2016 the average purchase price of raw cow's milk was higher by 20,1 %. The purchase prices of individual quality classes of milk annually increased from 19,8 % till 45,7 %.

Chart 1 **Average purchase price of raw milk in the years 2015 - 2017 in the Slovak Republic**
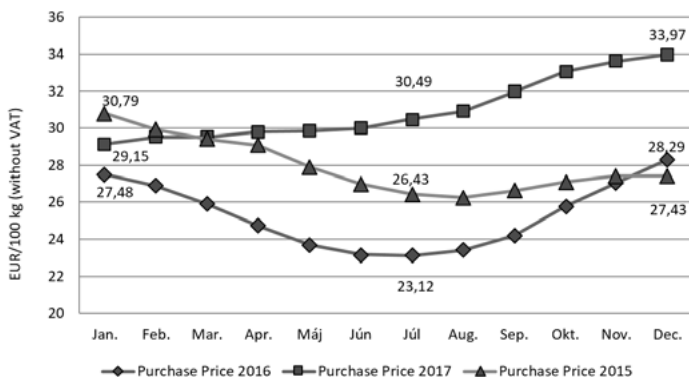
Source: Own processing pursuant to the Monthly reports on purchase of milk and cream and production of milk products (MARD SR).

In 2017 the development of average purchase prices of raw cow's milk was auspicious in comparison with the development of these prices in prior years 2015-2016 (Chart 1). In January 2017 the average purchase price of raw cow's milk was at the level of 30,79 EUR/100 kg and with the whole year 2017 continuously rose. The only decrease in price was recorded in March, it presented the slight decrease by 0,01 EUR/100 kg in comparison with the prior month February. From March the auspicious development between months continued and in December 2017 the average purchase price of raw cow's milk reached the level of 33,97 EUR/100 kg.

Chart 1 presents the inauspicious development of average purchase prices of raw cow's milk in the prior years 2015 and 2016. In January 2015 the average purchase price of milk was at the level of 30,79 EUR/100 kg, however in the following years the significant decrease of milk price was disclosed and continued in the year 2016. In the observed period the lowest average purchase price of raw cow's milk was in July 2016, exactly at the level of 23,12 EUR/100 kg. Since July 2016 the price of milk began gradually increase and after the year in July 2017 it overreached the level of 30 EUR/100 kg, concretely the level of 30,49 EUR/100 kg.

4   Conclusion

The period of year 2015-2016 is also referred to as the period of the middle milk crisis. The negative impact on the development of purchase prices of milk was presented by the abolition of milk quota regime in the European Union, terminated as at 1 April 2015. In addition, the ban on imports of agricultural products from the European Union into the Russian Federation, which was introduced on 7 August 2014, continued. The continuing Russian embargo and the abolition of milk quota caused the enormous surpluses of milk at the European market as the Russian federation was the second largest export market for the European agricultural products by then. In addition the weakened interest of the Chinese market in dried cow's milk was added. The high surpluses of milk at the European market led to the decrease in the purchase prices of milk.

In Slovakia the average purchase price of raw cow's milk fell below the threshold of 30 EUR cents per one kilogram of milk. The primary producers disclosed losses as pursuant to the Slovak Agriculture and Food Chamber the productions expenses are at the level of 40 EUR cents per one kilogram. The sum of means paid through direct payments, project subsidies and state subsidies reached approximately 9 EUR cents per one kilogram of milk according to the average efficiency. These subsidies significantly contributed to the mitigation of milk crisis consequences. We assume that within the year 2018 the prices of milk will decrease from the current level of 30 - 34 EUR/100 kg, while except for the trends on the world market the decrease will be supported as well as by seasonal continuous decline in the content of supplied components in milk. At the level of approximately 28 EUR/100 kg the price of commodity could be stabilized by the continuous demand for milk, especially for milk fats ("Milk in the year 2018", 2018).

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SESSION 8

NEW DIMENSIONS IN RURAL DEVELOPMENT AND SUSTAINABLE AGRICULTURE

IDENTIFICATION OF DEVELOPMENT HOT-SPOTS IN NÓGRÁD COUNTY

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Abstract

Paper's objective(s):

Several research attempts have been made to investigate disadvantaged rural areas; however, it is not easy to find one which would examine their development together with their immediate environment, and by complex methods. In our study we try to determine those "hot-spots" which could positively or negatively influence the development of a settlement. Our chosen territorial area is Nógrád County which is one of the most disadvantaged area in Hungary.

Data/Methods:

In our study we use a complex methodology, due to the fact that development processes of territorial units and their competitiveness play a key role in the formation of territorial differences.

Results/Conclusions:

In order for us to draw our conclusions about the spatial distribution of the indexes we created maps by using the Quantum GIS software, to better illustrate our results.

Keywords: *methodology, development, comparison, measurable*

JEL classification: *R10, R58*

1   Introduction

The role of rural and disadvantaged (or lagging behind) areas is getting more and more important in the policies of the European Union (EU). The main reason behind this is the presence of differences between regions in size, historical, economic, social and environmental development level and in many other aspects. A region's survival is strongly connected to the capital invested into them but there are two well-known ways how could they attract it. Firstly, they have to utilise their resources or they have to improve their infrastructure. Both of them need capital for their initiation, but the benefits gained may be worth it.

Several researchers (Péli, 2015, Káposzta 2014) state that the most significant development activities must be carried out in the centres, because only these 'core areas' can generate dynamic growth in their agglomeration areas, and in the ever expanding outer peripheries. Furthermore, they state that the main driver of regional disparities is the restructuring effects of socio-economic processes and these factors become more and more significant. As a solution for the peripheral (lagging behind) regions they mention the knowledge about processes resulting regional differences and their impact on the spatial structure, the endogenous based development strategies and improvement of internal capital.

The standpoint of the EU is that each region has a specific 'territorial capital' that is distinct from other areas and generates a higher return for specific investments than for others, since these are better suited to the area and use its assets and potential more effectively. For example, many rural areas possess values which are not obvious for the first sight, but they can be utilized for many purposes, for example, as recreation areas. The role and the importance of the locality is a growing issue in the EU and worldwide as well. Besides the rational planning of community resources and the full-scale mapping of local resources the involvement of the local population is very important in working out complex development directions. (Áldorfai et al. 2015).

Areas without strong secondary and tertiary sectors, well-developed infrastructure, basic services and jobs have some good opportunities (and give the basis of the new initiatives) in the time period 2014 and 2020 by the help of rural development policy of the European Union (EU) (Ritter et.al, 2013). According to the development policy the importance of the industrial development in rural areas, the improvement of the food economy and infrastructure, improving social situation and the expansion of rural tourism, environment has emphasized (Káposzta and Nagy, 2013). However, Kassai and Ritter (2011) said that in order to an area could implement a form of Local Economic (endogenous) Development or could be competitive they must have strong infrastructural endowment

and local communities. This is also the opinion of Aschauer D. (1990). He thought that some of the possible gains to the quality of life and to economic performance might arise from increased infrastructure investment. Numerous past infrastructural investments have been responsible for significant improvements in the overall quality of life in terms of health, safety, economic opportunity, and leisure time and activities.

The development levels of countries are measured generally by their GNI, while regions are measured by using GDP (European Commission, 2015). Experts have been debating for decades about the usage and content of GDP, as an indicator measuring economic development. It is clear that it properly represents income levels; however, it cannot be applied for measuring competitiveness or social welfare, due to its lacking nature (Stiglitz et al, 2010).

According to Csath (2016) beside the governmental, infrastructural, macroeconomic and human resources data, data related to innovation, technological readiness and innovation abilities are very important in the development level of a region. Innovation activity and income levels show positive correlation, which means that in those areas, where intensive knowledge-based activities are carried out, and the proportion of R&D spending is high, we can see higher income levels. We can easily observe the opposite situation in the case of lagging behind areas.

In Hungary the territorial inequalities increased after the political transition in 1989-1990. The seven statistical regions created as a requirement for the EU therefore, they do not cover homogenous territories. This is one of the reasons why the development level of the capital city is much higher than the other regions' status and distorts the development data of the Central-Hungarian region in a positive way (Budapest produces approximately 40% of the Hungarian GDP) (Káposzta-Nagy, 2013). Now Budapest belongs to the 25 best-performing regions in the European Union, but four regions out of the seven belong to the 20 poorest regions of the EU: Northern-Hungary, Northern Great Plain, Southern Great Plain, Southern Transdanubia (Tóth, 2016).

The development trends and regional competition processes are generated by the changes in natural resources, endowments, population, production, infrastructure, and their relationship in a country and in its regions. It is important to be noted, that there are factors that the regions can change in order to improve their conditions, and there are ones, which they cannot. Péli and Neszmélyi (2015) found that in Hungary, between 2003 and 2010 only Budapest and its expanding agglomeration, namely Central Hungary, was the only region that could improve its status over the seven years. Settlements in this area, therefore, automatically enjoyed some privileges, which farther regions could not. This result shows well the high level of regional disparities in Hungary.

Due to the complexity of regional differences it is not advisable to conduct regional analysis based on only a few economic indicators. The financial resources of rural development are not sufficient to satisfy the development needs of rural areas; the financial resources for improving the rural economies are also not sufficient for generating growth in these areas. However, successful settlement development can only be carried out within a complex approach (Áldorfai et al, 2015)

It is one of the basic problems of development that Hungarian and international strategic documents are methodologically lacking sometimes. Despite the fact the requirements of the EU are getting ever stricter towards these documents, their quality shows significant fluctuation. Therefore, a complex methodology, perspective is needed to solve this problem. This complex method ensures a systematic approach, the investigation of local problems and provides a new way to create an objective situation report for strategy generation (for example CLLD); it enables its user to create a basis for monitoring economic activities and to designate hot spots for development. The methodology this study presents (Regional Performance Analysis) uses static and dynamic indicators for the examined time period for the changes in development of a certain region. By the help of this analysis hot spots can be defined. It means that those areas will be discovered which need development, and those strengths are also identified, which the development activities can be based. Also, it provides opportunity to investigated indicators and dimensions in a smaller and in a larger region as well.

2   Data and Methods

Based on the literature background and our own experiences our pre-defined indicator systems contain 60 basic indicators, including 40 complex indicators along four dimensions, which are the local economic, the society, the environment and the infrastructure. Performance analysis – based on indicator groups related to the abovementioned four dimensions – measures a region in two ways. First, it measures the natural evolution level – dynamic analysis –, in which the changes of the region are investigated in the time period between 2006 and 2013. The next step is the analysis of the development level – static analysis – in which the situation of the region is investigated in every year of the programming period 2007 and 2013 time period. As a basis we choose the settlement structure and dataset of the year 2006 for comparison. Our chosen area is Nógrád county, part of Northern-Hungary region which is one of the most disadvantaged region not only in Hungary but also in the European Union. We collect data for every settlement in the county, then the performance of certain settlements (evaluated by the pre-defined criteria-system) is compared to the County and also the Regional

values. After that, by taking the average value of the indicator groups we can describe the performance of the region on indicator, dimension and index levels. Finally, we illustrate the results at settlement, county and regional level on various maps by the use of Quantum GIS program.

3 Results and Discussion

The classification of the Regional Performance Analysis (RPA) is indicated by Table 1, which, based on our methodology, contains 7 categories (intensively developing, developing, began developing, stagnant, lagging, declining, more declining) on a scale from -100 to 100.

Table 1 **The classification of the Regional Performance Analysis**

Classification			
Sorting			Name
50,001	⇐	100	intensively developing
20,001	⇐	50	developing
5,001	⇐	20	began developing
-5	⇐	5	stagnant
-20	⇐	-5,001	lagging
-50	⇐	-20,001	declining
-100	⇐	-50,001	more declining

Source: The author's own editing.

Table 2 illustrates in separate cells the dimension-, indicator- and index level results of our research. The county belongs to the lagging category on index level, similarly to the dimensions of society, local economy and environment. Only the infrastructure dimension could reach the stagnant state.

Table 2 **The result of the Regional Performance Analysis (county level)**

	Local economy											
	The proportion of businesses operating within the registered ones	Number of retail stores per capita in 1000	Gross value added per capita	Revenue from small-scale agriculture per 1000 inhabitants	The relative income per one inhabitant of working age	Number of commercial accommodations per capita in 1000	Number of catering establishments per 1000 inhabitants	The number of guest nights per guest in one of the commercial and non-commercial accommodation	Number of non-commercial accommodations per capita in 1000n	The number of subsidies payed within the frame of the 1., 3. and 4. axes of the EAFRD	The amount of local taxes per capita	Dimension value
Nógrád County (county)	-20,2	-10,2	-18,7	-58,5	0,6	-58,1	12,2	-8,7	-17,0	30,8	-6,7	-14,1
Nógrád County (region)	11,5	-20,6	-28,0	-62,5	-11,4	-66,3	2,9	-4,8	-18,4	25,5	-16,6	-17,2

	Society										
	Net migration per 1,000 persons	Natural increase per 1,000 persons	Population density	Aging index	Dependency index	Relative economic activity (%)	The relative ratio of registered unemployed	The relative indicator of the registered people unemployed for more than 180 days	Regular social assistance amount used per 1000 inhabitants	Participating in cultural events per 1000 inhabitants	Dimension value
Nógrád County (county)	-12,8	-12,5	-23,5	-0,2	6,8	7,3	-14,5	-17,5	-7,8	-9,1	-8,4
Nógrád County (region)	-9,3	-29,2	-51,9	-13,8	-14,1	-10,7	-7,6	-14,1	-14,1	-10,1	-17,5

	Environment									
	The amount of municipal solid waste shipped from the inhabitants	The generated amount of hazardous waste	The proportion of homes involved in regular waste collection	The rate of households involved in selective waste collection	The proportion of recycled municipal solid waste	The primary utility gap	The amount of support payments related to environmental actions per 1000 people	Fines, penalties and other special revenue of the Local Government related to local taxes	The volume of wood per 1 hectare	Dimension value
Nógrád County (county)	-48,7	71,9	-2,8	-71,3	-67,8	-5,5	-6,9	49,4	-5,0	-9,6
Nógrád County (region)	-37,1	72,0	-10,4	-69,9	-67,3	-22,5	-13,4	40,2	2,0	-11,8

	Infrastructure										
	Average distance in time to the micro-regional centers	Secondary utility gap	The rate of domestic gas consumers	The rate of household electricity consumers	The number of passenger cars per 1,000 persons	The number of patients per one family doctor	The number of social catering recipients per 1000 inhabitants	Average student numbers in primary schools	The rate of public spaces and roads built by the Local Government	The rate of sidewalks built by the Local Government	Dimension value
Nógrád County (county)	-1,3	-20,0	-10,0	-6,5	13,3	14,3	-14,1	-5,5	-24,9	7,4	-4,7
Nógrád County (region)	-6,4	-21,0	-5,2	-12,8	18,8	15,0	-2,4	-5,5	15,5	-21,5	-2,5

Regional Performance Analysis - Nógrád County (county)	-9,31
Regional Performance Analysis - Nógrád County (region)	-12,39

Source: The author's own editing.

The results of the aggregate index and the dimensions clearly indicate that the values of the index are even lower compared to the regional level, except for the infrastructural dimensions. It means that the county level infrastructure performs better than regional level infrastructure in the investigated time period. We can observe a similar trend on indicator level; in other words, infrastructural indicators show a significantly better situation than the indicators of other dimensions, compared to the regional level.

Local economy

The lowest performing indicators were the 'income from agriculture' and the 'number of commercial accommodations'; however, the 'payments from axes 1, 3 and 4 of the ERDFA' performed outstandingly, regardless of the reference points. From this we drew the conclusion that the agricultural and tourism activities of the county are not highly significant sectors in the county; on the other hand, there is a great effort to improve this situation, since the ERDFA payments were used to develop SMEs. As a result, the county shows a better situation regarding to the operating enterprises compared to the regional data. Unfortunately, none of the other indicators showed similarly positive values, which means that despite the development activities and efforts, they could not push the local economy onto a development path.

Society

On county level we could not find outstanding values regarding to this dimension, however, compared to the regional level values we could; it can be observed that the population and natural reproduction is significantly low, and other demographic indicators are also lower, when compared to the regional level. In the case of unemployment data we can see better results, which may be the result of the efforts to obtain more development funds.

Environment

On the indicator level the environment dimension shows the most significant different, by which we mean that the highest and lowest values were both produced by this dimension. This duality comes from environment protection, since the high amount of hazardous waste produced here and fines related to waste management is very high in the county, but selective waste collecting and waste utilisation is very low. This leads us to believe that the infrastructure related to waste management is weak in the region.

Infrastructure

The number of general practitioners and the infrastructure related to personal transport shows stable development compared to county and regional levels, unlike the public utility gap, which shows the lowest value from the indicators. We can observe a certain duality in this dimension as well. This duality is about the roads and sidewalks. Compared to the county level the size of the sidewalk network is large enough to be a strong point, while compared to the regional level

the size of the road network was high. It means that these indicators were not particularly strong on a county level, but on regional level, they were.

The results of the analysis of the settlement level data are presented on maps. According to Péli (2015), the most important development investments need to be implemented in the centres, because only these core areas are able to generate dynamic growth in their agglomerations, and in the gradually growing peripheries. This theory is proved to be right, based on our calculations. There are 6 towns in Nógrád county, one of which is a county seat. These cities (all marked in black circles) are located in the outer perimeter areas of the county, along the main traffic corridors (primary roads). Consequently, the inner core of the county does not have a city or a primary road, which is a major obstacle to development.

Our Regional Performance Analysis also uncovered this fact, and the results can be seen on Figure 1. The cities and the areas marked on the map are stagnating or started developing on a county level, which is not only the result of the generated economic growth but also the transport possibilities. It can also be seen that along the main traffic route of the county, the performance of the settlements is higher than the county's inner core. This observation is similar to another theory, which says that major roads pull the resources in the direction of the core areas from the peripheries. On a regional level, development can no longer be observed at settlement level as shown on the map on the right side of Figure 1. Even the performance of the county seat declines in a regional comparison. However, we can see that a significant part of the settlements with stagnant performance are also located in the main traffic corridors. Our results reveal that in the case of towns the interrelations of the economic and infrastructure dimensions, while for small settlements the economy and the environment dimensions are the hot spots along which development has started. Unfortunately, in the case of declining performance settlements, we observed the combined negative effect of 3 dimensions. Thus, in these settlements, the results show a degree of deterioration that whole dimensions can be identified as hot spots. In our opinion, a settlement alone cannot respond to more serious challenges, so external intervention is necessary if we want to prevent the collapse of these settlements.

Figure 1 **The results of the Regional Performance Analysis of the settlement level**
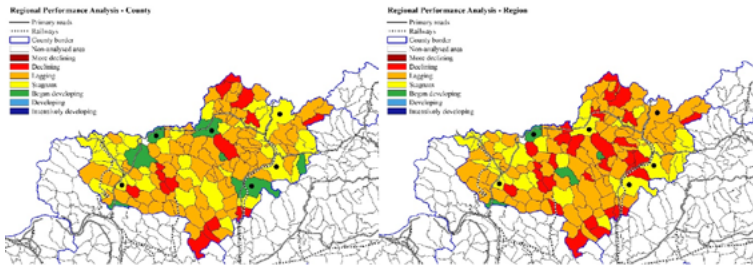
Source: The authors' own editing by using the QGIS application, 2018.

Note: In the case of the map on the left we used the county level, while for the map on the right we used to regional level values as reference.

Local economy (Figure 2) is a lagging dimension, and the worst-performing dimension of the region; however, it was found that on settlement level we can observe development, to some extent. The result of the performance analysis is that on county level five settlements are developing, 22 settlements have started to develop, 13 settlements are stagnant, 33 settlements are lagging, 55 settlements are declining and 2 settlements are even more declining (in a regional comparison the results are even worse). This distribution indicates the local economic situation of the county well. It was interesting to find that the developed settlements are somewhat dispersed; however, they are mostly situated close to larger towns or transport hubs. It was also found, that around these settlements the economy has started to decline. This may be because the developing settlements drain away the economic potential (e.g. labour force) from them, and they could not counter this effect so far.

As we have uncovered at the county level analysis, it was observable on a settlement level as well, that in the case of local economy, except for developing settlement, neither tourism nor agriculture prospers, in spite of the fact the main profile of the settlements of Nógrád county used to be agricultural small-scale production (Figure 2). In addition, there is no development in the other branches of the economy, as in the majority of settlements the gross added value is lagging. Thus, we determined that the hot spot of local economy should be the development and competitiveness of the local enterprises.

Figure 2 **The map of the local economy dimension of the Regional Performance Analysis (settlement level)**
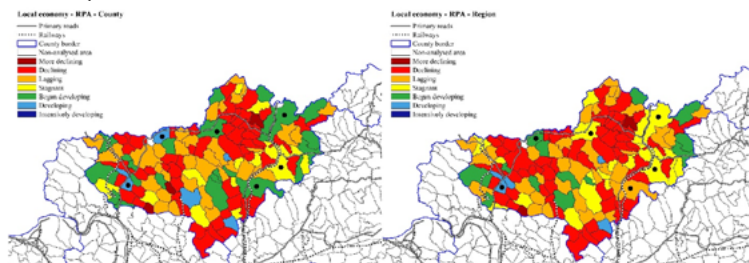
Source: The authors' own editing by using the QGIS application, 2018.

Note: In the case of the map on the left we used the county level, while for the map on the right we used to regional level values as reference.

The society dimension (Figure 3) is also lagging, but it shows a better situation than the local economy dimension, based on the Regional Performance Analysis. We can observe it here, too, that the differences between the lowest and highest values can be significant on county level.

Figure 3 **The map of the society dimension of the Regional Performance Analysis (settlement level)**
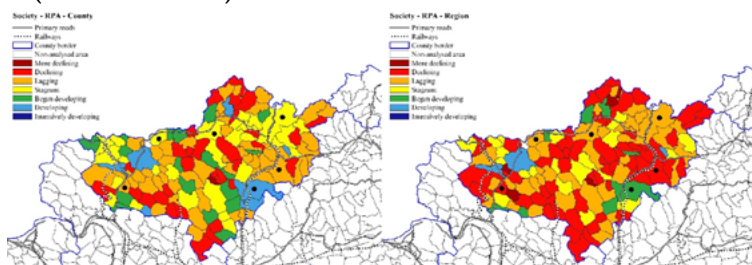
Source: The authors' own editing by using the QGIS application, 2018.

Note: In the case of the map on the left we used the county level, while for the map on the right we used to regional level values as reference.

It is not unambiguous on the county level, but it is on the regional perspective that the performance of the society is significant along the traffic corridors and is lagging behind in the inner core. It is also possible to observe that the social situation of rural areas is better than that of cities. From this we came to the conclusion that in these areas social relations, the rural environment and the Hungarian and minority culture play an important role in the development of social structure in

the county. On the regional level, these factors disappear and a significant decline can be seen in the county.

The infrastructure dimension (Figure 4) is the only one showing a stagnating situation (and it can be also observed that the lowest differences between the highest and lowest number can be found here), based on the Regional Performance Analysis. As it was mentioned in the introduction, the survival of a settlement depends greatly on the capital invested in there, and this capital can be attracted by using own resources properly or improving the local infrastructure.

This statement proved to be true in our analysis, since those settlements, which did not show neither economic nor social development, are also lagging in infrastructural sense in the past 7 years (Figure 4.). This indicator is not affected by the direction, type of size of the main roads, but the answers given by the local decision makers aiming to counter its problems.

Figure 4 **The map of the infrastructure dimension of the Regional Performance Analysis (settlement level)**
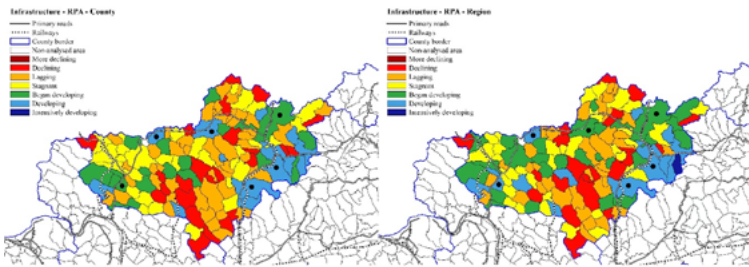
Source: The authors' own editing by using the QGIS application, 2018.

Note: In the case of the map on the left we used the county level, while for the map on the right we used to regional level values as reference.

As it was mentioned before, the environmental dimension (Figure 5) was the only one, which stagnated from the four dimensions. On the indicator level this dimension shows significant differences, but one section (waste management) can be established as leading potential. There is a certain concentration on settlement level, creating both negative and positive hot spots as well. This may be the result of the organisation of waste management, and also of differences in the environment-awareness of the population.

Figure 5 **The map of the environment dimension of the Regional Performance Analysis (settlement level)**
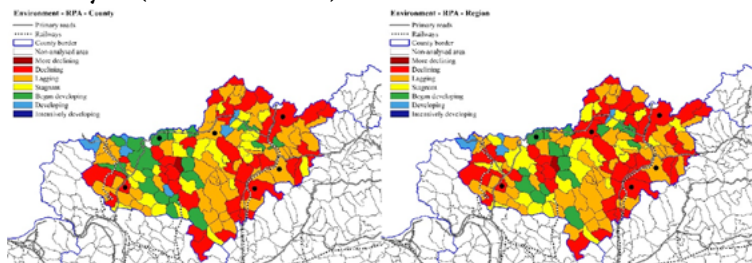
Source: The authors' own editing by using the QGIS application, 2018.

Note: In the case of the map on the left we used the county level, while for the map on the right we used to regional level values as reference.

4   Conclusion

It is clear from our research that towns and major transport routes play a significant role in development of the county's resources. Because of close to them significant economic and social development can be observed, but farther from them only infrastructure development could be measured. Wastewater management and its organization are a major hot spot, despite the high environmental awareness of the population in the county. The social situation of rural areas in the region is better than the towns. In these areas, social relations, the rural environment, and the Hungarian and minority cultures play a significant role in the development of social structure, but on regional level these factors disappear and significant social decline is observable in the county. Agriculture and tourism are not significant sectors of the region, despite the fact that the main profile of the settlements of Nógrád County used to be small-scale farming. In spite of high level of application intensity, developments and other efforts, this branch of the county's economy could not be pushed in a positive direction. Other branches of the economy showed no progress either, as in the majority of settlements the gross value added is weakening. Thus, we determined the development and competitiveness of economic enterprises as the hot spot of the local economy. Our results reveal that in the case of towns the interrelations of the economic and infrastructure dimensions, while for small settlements the economy and the environment dimensions are the hot spots along which development has started. Unfortunately, in the case of settlements with declining performance, we observed the combined negative effects of 3 dimensions. Thus, in these settlements, the

results show a degree of deterioration that whole dimensions can be identified as hot spots. In our opinion, a settlement alone cannot respond to more serious challenges, so external intervention is necessary if we want to prevent the collapse of these settlements.

We believe that we started to develop a new methodology with our study, which shows similarity to many theoretical concepts, and therefore it supports the foundation of development plans. Since the index can be derived to all of its elements, including the levels of dimensions and indicators, as well as to static and dynamic analyses, we can see that which are the specific local characteristics, strengths and weaknesses. Also, we can see that which regions perform better or weaker. By learning these we can find those development nodes/hot spots (which can be either characteristics or geographical areas) which are necessary to develop, or on which later development can based on. We believe that the Regional Performance Analysis has the potential to describe reality with static and dynamic methods to identify development paths in a given time period. Therefore, reflects to the market economy, social and other global processes, and to development initiated by national and international capital as well. In other words, we can tell how successfully the regions could meet the challenge posed by these processes.

Acknowledgements

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THE IMPACT OF UKRAINE'S EUROPEAN INTEGRATION ON THE DEVELOPMENT OF AGRICULTURE

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Abstract

The purpose of this article is to resolve the following issues: the generalization of the peculiarities of the implementation of foreign trade relations between Ukraine and the EU within the framework of the current order; definition of the state and trends of export-import activity on the main types of products; to evaluate the impact of European integration on the development of the agricultural sector; forecasting foreign trade of Ukraine with agro-food products. On the basis of the calculations, a forecast was made for changes in the import and export of agricultural products. Gravitational modeling of Ukraine's foreign trade in agro-food products (groups 1-24 UCG FEA) has made it possible to establish that the current crisis has considerably aggravated the country's ability to benefit from integration with the EU within the framework of a deep and comprehensive free trade area. It was stated that in the short-run and long-term, the country's positive effects on European integration are possible only if a complex of organizational and economic measures is implemented to ensure the quality and safety of agricultural products.

Keywords: *agrarian sector, competitive advantage, euro integration, quality, safety*

JEL classification: *Q10, F02*

1   Introduction

The study of the prospects for the entry of enterprises of the agrarian sector of Ukraine into the market of the European Union is urgent, as the need for further

development and expansion of the presence of domestic producers of agro-food products in world markets is obvious. At the present stage, the economic situation in the agro-industrial complex of Ukraine is complicated by a number of problems, the solution of which can only contribute to deepening its integration into the system of world economic relations. Provided that almost two thirds of Ukraine's GDP (gross domestic product) is exported in recent years, export restructuring is an important criterion for the development of the economy and the country's competitive advantages in the world division of labor. In the conditions of the global agrarian crisis, Ukraine can increase its presence in the global market as a producer of food products, but it requires improving the quality of products based on the introduction of advanced technologies, improving breeding and livestock breeding etc.

Therefore, the study should assess the impact of European integration on the development of the agricultural sector of Ukraine, which is important in the formation of foreign exchange earnings from exports and the formation of GDP.

2   Data and Methods

The argumentation of the theoretical positions and the conclusions that characterize the impact of European integration of Ukraine on the development of the agricultural sector was based on a systematic approach that envisages general scientific (dialectical, intuitive, scientific abstraction, induction and deduction, analysis and synthesis, the laws of logic) and economic methods of research: comparative analysis - comparison of quantitative and qualitative indicators of actual and planned development of domestic agriculture and European countries, assessment of positive and negative features of European integration for Ukraine; statistical-economic and graphic - collection, processing of statistical data, grouping, research of the dynamics of economic parameters of the agrarian sector of Ukraine; synergetic - the gradual growth and development of agrarian relations in the context of coordinated interaction and complementarity of the EU and Ukraine's economic management systems; economic and mathematical - definition of competitive advantages of the agrarian sector of the economy and forecasting the probability of their increase, preservation or loss of certain types of agricultural products in the European market; monographic - study of the peculiarities of Ukraine's integration with the EU in the agrarian sector. Forecasting of foreign economic activity was carried out on the basis of gravitation models of export and import of agro-food products. The information base of the study consisted of legislative and regulatory acts regulating agricultural legal relations in Ukraine, official statistics of the State Statistics Service of Ukraine, the Ministry

of Agrarian Policy of Ukraine, international and European organizations (US-DA-NASS, UN Comtrade, EUROSTAT), the EU Quality Directive and product safety, rural development, monographic works and scientific publications of domestic and foreign authors; scientific and analytical information of the Internet network, the results of the author's personal analytical generalizations.

3   Results and Discussion

It is known that the most common forms of integration in the modern world are free trade zones and customs unions. The integration option has accompanied Ukraine throughout the history of its independent existence, which was carried out between two integration groups the EU and Russia, which are significant in size and important trade partners [1].

The main problems in the agricultural sector are low labor productivity, high level of depreciation of fixed assets, use of outdated technologies by small and medium-sized agricultural enterprises, excessive employment, inappropriate organization of production, insufficient level of infrastructure development in rural areas, etc. Ukraine's accession to the WTO contributed to the formation of a new national customs tariff. The average tariff rate for all product groups in 2014 was 5.8% (10.9% for agricultural products and 5% for industrial products) [2]. The statistics on foreign trade in the industry confirm that oil production has become the only industry that has benefited from accession to the WTO. This became possible due to the fact that before the accession of Ukraine to the organization managed to carry out technical modernization in the industry and increase its competitiveness. Today the export positions of the industry on cereals, fats and oils of various origins have coincided.

The main factors hampering the growth of export of industry products are insufficient competitiveness of the industry, lack of effective agrarian policy of the state and the national strategy for the development of this industry. At the same time, low purchasing power of the Ukrainian population, low level of profitability of commodity producers and devaluation of the national currency to the euro led not economic access to imports of goods, technologies and services. Under such conditions, national producers of agricultural products failed to form and strengthen the competitive advantages of Ukranian classification of goods for Foreign Economic Activity 01-24, as well as to fully utilize the effects of import integration [3].

Consequently, from the author's point of view, the following characteristics of the agreement concluded between Ukraine and the EU can be distinguished: economic substantiation; evolutionary character; complexity; detail and structuring.

It is established that integration between Ukraine and the EU is formed on the basis of the asymmetric deep and comprehensive free trade zone model.

It is known that Ukraine is a leader in the export of a range of agricultural crops and foodstuffs. Among them, in particular, include vegetable fats, vegetable products and certain livestock products. At the same time, it has not yet been among the leading exporting countries, which determine world prices on agricultural markets. Today, Ukraine is confidently leading the external supply of oil, taking a prominent position in exporting barley and wheat.

The above calculations in table 1 show that in recent years, the share of Ukraine's agricultural exports has grown significantly, which is mainly due to favorable conditions of the external market. At the same time, the share of imports remains virtually unchanged (fluctuating within 10%) due to a decrease in purchasing power of the population and the devaluation of the national currency (hryvnia).

Assessing the qualitative growth of volumes and the share of exports, one can conclude that Ukraine is not fully utilizing the opportunities in foreign economic activity due to the fact that raw materials are mostly exorted. Consequently, in today's conditions, for Ukraine, the strategic priority of the development of agriculture and food industry should be the formation of stable agribusiness chains with high added value.

Table 1 **Dynamics of volumes and share of export-import of Ukrainefor the group 0-24 of UCG FEA**

Years	Export, million dollars	The share of exports in the overall structure of Export UCG FEA, %	Imports, million dollars	Import share in the overall structure of Import UCG, %	Balance
2005	4305	12,6	2684	8,7	1621
2006	4713	12,7	3166	6,9	1547
2007	6248	12,8	4111	6,7	2137
2008	10825	16,2	6457	7,5	4368
2009	9515	24,0	4936	10,9	4579
2010	9936	18,7	5762	9,4	4174
2011	12804	18,7	6347	7,8	6457
2012	17881	26,1	7520	8,9	10361
2013	17024	26,8	8184	10,7	8840
2014	16669	30,9	6059	11,2	10610

Years	Export, million dollars	The share of exports in the overall structure of Export UCG FEA, %	Imports, million dollars	Import share in the overall structure of Import UCG, %	Balance
2015	14563	38,3	3484	9,4	11079
2016	15284	42,1	3890	10,1	11394

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The generalization of the foregoing makes it possible to state the manifestation of the positive and negative consequences of European integration for the domestic agrarian sector. The following should be considered as positive: unification of phyto-sanitary standards will lead to strengthening of the positions on the world market; investing in manufacturing and processing industry can double production volumes and create additional jobs; increased volumes of organic production; improving the quality and safety of products; the growth of exports of confectionery, meat and dairy, oilseed fat, fruit and vegetable and brewing products; strengthening of the processes of cooperation of households; the establishment of EU zero import duties for goods covered by tariff quotas (about 85 tariff lines).

The negative factors include the following: a small proportion of enterprises certified according to international standards; the low quality of food products will not allow them to be exported to the EU; the underdevelopment of the market infrastructure will slow down exports to the EU; low capitalization of agricultural enterprises will prevent investments; the loss of a part of the domestic market when imports of food products increase; the problem of changing names due to the implementation of obligations to comply with geographical indications [4].

European integration for Ukrainian consumers will contribute to a slight decrease in prices for imported food products in the initial period of its import, the possibility to buy food products of higher quality, increase in the range of food products. As for the negative consequences, they will be manifested in the following: a possible tendency to increase domestic prices for sunflower oil as a result of higher prices for raw materials; familiarity with new products for some consumers will cause difficulties in terms of knowledge of quality content and equivalence in price.

It was established that the export of agrarian sector products in 2016 amounted to 15.2 billion US dollars, which is 4 billion more than in 2015, the share of agricultural products in the total export of the country reached 42%. The largest increase in exports was observed in the group of fats and oils of animal or

vegetable origin - by 20% compared to the previous period. The absolute figure for this category was almost 4 billion US dollars. Exports of vegetable products in excess of USD 8 billion were the highest in the monetary equivalents, including exports of grain crops to US $ 6 billion. In addition, in 2016, exported food products at 2.45 billion US dollars and live animals with products of animal origin at 0.78 billion US dollars.

In 2016 Ukraine imported products of the group 1-24 UCG FEA at 3.89 billion dollars. US, which is more than $ 0.59 billion in 2015 USA. In particular, imports of: live animals and animal products by 0.62 billion US dollars; products of vegetable origin to 1.3 billion dollars. USA; fats and oils of animal or vegetable origin at USD 0.25 billion; ready-made food products at 1.7 billion US dollars. Consequently, in 2016, a positive foreign trade balance was formed for the goods of group 1-24 of the Ukrainian Foreign Economic Association in the amount of $ 11.4 billion.

At the same time, in 2016, European countries ranked second among the importing regions of agri-food products with a share of 27.5%, giving way only to Asian countries. In the total same trade in agricultural products, the EU share of last year amounted to 31.5%. The top 5 importing countries of our products from the EU include Spain, Poland, the Netherlands, Italy and Germany.

The main products of Ukrainian exports to the countries of Europe in 2016 were (on cost indicators): cereals, oil, oilseeds, fruits and nuts. There is an increase in demand for honey, meat, confectionery and juices.

In 2016, against 2015, the growth of exports of domestic agricultural products was due to an increase in supplies of commodity groups such as sunflower oil - by 505 million dollars. US, sunflower seeds - by 36.1 million, sugar - by 16.5 million US dollars. It has been established that a significant increase in exports of niche fresh or processed products: canned tomatoes - by 14.3 million dollars. The USA, or 2 times, vegetables fresh and chilled - 4 times, cucumbers - in 2,7 times, fresh fruits - in 2,5 times, margarine products - 9 times.

As it is now known, only 266 Ukrainian enterprises have the right to export products to the EC. Of these, 86 enterprises - food producers, 180 enterprises - producers of non-food products.

Imports of European products to Ukraine increased in 2016 and steel: sauces, coffee, tea and others - 233.6 million dollars. US, cocoa beans and chocolate - 113.7 million, as well as cereals - 105.6 million US dollars, etc. The balance of bilateral trade between Ukraine and the EU in the group of 1-24 UCG FEA foreign trade in 2016 amounted to over 2.3 billion US dollars. The foreign trade turnover of agricultural products between Ukraine and the EU countries in 2016 amounted to 6182.9 million US dollars.

We have carried out a comprehensive comparative analysis of the main groups of agricultural products in the foreign market by the model "food independence competitiveness." As an indicator of food independence we will adopt the Food Independence Index (F):

$$F = \ln \frac{p * 100\% \div (m + p * s - x)}{n} \quad (1)$$

where, x – the volumes of export of a particular product from the country; m – volumes of import of goods into the country; p – volumes of domestic goods production in the country; s – change in the volume of goods in the country; n – the minimum share of goods of domestic production.

We consider that as an indicator of competitiveness it is expedient to take the modified Balass index, that is, one of the options of the index of comparative advantages (RCA):

$$RCA = \ln \frac{(x_{ij} : m_{ij})}{\sum x_{ij} : \sum m_{ij}} * 100 \quad (2)$$

where, x_{ij} - volumes of export of goods j from country i; m_{ij} - volumes of import of goods j to country i; $\sum x_{ij}$ - total volume of exports from country i; $\sum m_{ij}$ - total volume of imports into the country i.

Using the natural logarithm in the calculation of both indices extends the possibilities of cluster analysis, since it will allow the distribution of the values of food independence indices (F) and the identified comparative advantages (RCAs) in the field of positive and negative values. Thus, this approach facilitates the comparison of the values of the indexes F and RCA, which will allow to clearly divide food products into clusters.

The results of two-criterion analysis of the state of the food market will be applied to the plane with the abscissa, corresponding to the food independence index (F), and the axis of the ordinate corresponding to the indicator of the discovered (open) comparative advantages (RCA) [5].

For the analysis on the coordinate plane, vertical and horizontal lines corresponding to the threshold values of the criterion are applied. Due to the use in the formulas of both indices of a natural logarithm, threshold values become apparent.

Determining the maximum (minimum) permissible level for each indicator is an important methodological issue. As for the index of food independence, if the share of agricultural raw materials and food of domestic origin in the total

volume of commodity resources of the domestic market exceeds the established normative index, then F> 0. In case of excessive import dependence and decrease of domestic production to the level of excessive import dependence and decrease of domestic production to the level established by the government of the country F<0.

The study found that the minimum acceptable level of food independence could be interpreted differently for different food products, depending on the level at which level the market food supply can or should be achieved on the basis of its own production. Obviously, food self-sufficiency is recognized within the industry by the level of food independence within the limits of 70-80% of the commodity resources of the internal food market [6-8].

The economic content of the index of discovered (open) comparative advantages of the industry (RCA) is based on the ability of the industry to fill the domestic and foreign markets of its own products more successfully than foreign competitors do. On the coordinate plane of the model of two-criterial analysis of the food market, four quadrants can be distinguished: 1st quadrant: groups of agricultural products that are competitive on the domestic and foreign markets; food supply to national consumers exceeds the level of food independence; 2nd quadrant: food products that are competitive and in demand on the domestic and foreign markets; food self-sufficiency of national consumers below the level of food independence; 3rd quadrant: groups of noncompetitive food products in the foreign market are replaced by imports on the domestic market; food self-sufficiency of national consumers below the level of food independence; Quadrant 4: Noncompetitive food products in the foreign market; food self-sufficiency of national consumers exceeds the level of food independence.

Each of the quadrants of the model of two-criterion analysis of the food market must meet the appropriate regulatory measures. So, if the group of food products as a result of the analysis appeared in the 1 st quadrant, this means that the country's agro-food sector has completely fulfilled its task the domestic market is saturated, the sector also carries out the supply of goods to the external market. An effective policy of agri-food policy should be economic diplomacy to support agricultural exports and measures to stimulate exports on the basis of intensifying the activity of the foreign-economic activity infrastructure.

The 2nd quadrant of the model, the quadrant of food threats, includes food products that are competitive and in demand on the external and internal markets, but significant external demand, for example, as a result of crop failure in major producer countries, can stimulate surplus exports and create a deficit on the domestic market. the market. Such a provision could pose a threat to national food security and would result in significant financial costs for imports, a severe

crisis in related and processing industries. Government can recommend measures to reduce export activity.

The domestic market of agri-food products that have fallen into the 3rd quadrant model need protection, as they can not withstand competition not only on the external but also on the domestic market. The volumes of their production are insufficient and superseded by imported goods. In this regard, food insecurity of the country is under threat, the main measures should be instruments of protection of the domestic agro-food market.

The 4th quadrant includes a less problematic sector of food products that are not competitive on the external market, but the task of food independence has been resolved. In this case, the government needs not only to monitor the implementation of food independence criteria, but also to adjust the priorities of the export specialization of the agro-food sector. If the product is not one of the priorities of export policy, its presence in the 4th quadrant already has a position close to the optimal one. In the long run, it is advisable to optimize the level of security of these markets by eliminating excessive restrictions on the availability of the domestic market and the cost of internal subsidies, replacing subsidies within the "yellow box" with green basket tools, etc.

The use of the model of the two-criterion analysis of the agro-food market "food independence - competitiveness" involves the development of priorities for the protection of the domestic agro-food market through the following tasks: the breakdown of food products into groups of objects, similar in terms of food independence and competitiveness criteria, makes it possible to simplify the further development of measures for the protection of the internal market and other measures to regulate the agro-food sector; the international comparison of the state of food markets on the basis of comparable international statistics and WTO data on the level of protection of the agro-food market, will allow systematizing the study of foreign experience in this field and increase the efficiency of its implementation; The implementation of two-tiered analysis in the dynamics, that is, operative tracking of trends (vectors) of market development within the framework of this model will allow to assess the effectiveness of using measures to protect the domestic market and timely adjust them.

Most domestic researchers are united in the opinion that grain and oil subcomplexes are the most competitive sectors of the agrarian economy. At the same time, beet sugar, fruit and vegetable, meat, milk and other subcomplexes have weaker competitiveness, which causes a high proportion of imported agricultural products in the total volume of commodity resources of the domestic market.

Considering the commodity structure of Ukraine's food exports on average, in the period of 20092015, in the structure of export of products of the group 1-24

UKT FEA (Figure 1), the largest share for the period under study was made up by 32.6% of grain crops. In the second place are fats and oils of animal or vegetable origin, which accounted for 22.8%, followed by seeds and fruits of oilseeds 11.2%, milk and dairy products, poultry eggs, natural honey 5.3%, balances food industry waste 4.8%, other food products 18.8%.

Figure 1 **Commodity structure of Ukraine's food export so naverage for 2009-2015**
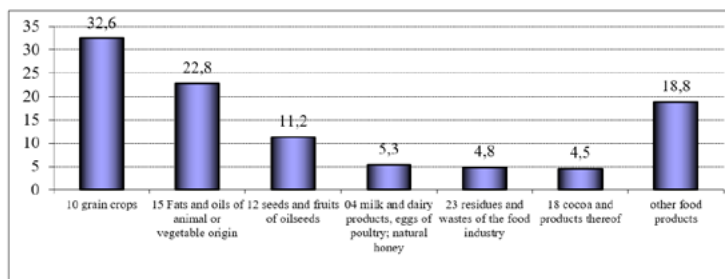
Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

In the commodity structure of Ukraine's food imports, on average, for the period of 20092015, the largest share was (Figure2) edible fruits and nuts (12.2%), fish and crustaceans (9.6%), various food products (8.6%), meat and edible meat products (8.5%), tobacco and industrial tobacco substitutes (7.5%), fats and oils of animal or vegetable origin (7.2%), other food products (34.1%). It should be noted that domestic imports have a more even structure, without clearly expressing the dominance of some of them.

It is obvious that the development of foreign trade in agricultural raw materials and food should be subordinated to the task of efficient use of the resource potential of the domestic agrarian economy. In accordance with the theory of comparative advantages of Heckscher-Olina, regulation may distort the functioning of a market mechanism, reduce the effects of the international division of labor, as it will allow for the full benefit of comparative advantage.

We are studying on the basis of quantitative analysis of the comparative advantages of the domestic agro-food sector. We have shown above that one of the tools for assessing comparative advantages is the modified index of comparative advantages (RCAs).

Figure 2 **Commodity structure of Ukraine's food imports on average for 2009-2015**
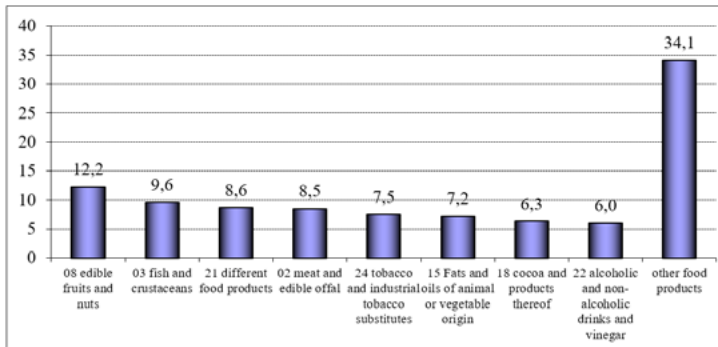
Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

Table 2 presents the results of the evaluation of the index of comparative advantages identified for food products in 2009-2015.

Table 2 **Results of evaluation of the indexes of the revealed comparative advantages to the goodsAgro-food group of Ukraine, 2009-2015**

The code and the name of the goods according to the Ukrainian Foreign Ministry	2009	2010	2011	2012	2013	2014	2015	On average, 2009-2015
I. Live animals; products of animal origin	-0,129	-1,293	-1,411	-1,021	-0,802	-1,447	-1,289	-1,056
01 live animals	-2,733	-3,072	-2,706	-3,466	-2,754	-3,395	-2,897	-3,003
02 meat and edible offal	-0,541	-2,939	-2,628	-2,170	-1,091	-1,693	-1,320	-1,769
03 fish and crustaceans	-4,457	-5,640	-3,586	-3,843	-3,949	-4,466	-4,458	-4,343
04 milk and dairy products, eggs of poultry; natural honey	1,734	1,068	0,565	1,022	0,842	0,271	0,236	0,820

The code and the name of the goods according to the Ukrainian Foreign Ministry	2009	2010	2011	2012	2013	2014	2015	On average, 2009-2015
05 other products of animal origin	-0,265	-1,185	-1,495	-0,994	-1,382	-1,745	-1,680	-1,249
II. Products of vegetable origin	0,599	0,822	0,729	0,388	0,412	0,467	0,469	0,555
06 live trees and other plants	-3,482	-4,368	-4,315	-4,269	-4,684	-5,434	-4,943	-4,499
07 vegetables	0,839	-0,623	0,061	-0,631	-0,704	-0,923	-1,232	-0,459
08 edible fruits and nuts	-0,828	-1,736	-1,932	-1,801	-1,848	-2,599	-2,927	-1,953
09 coffee, tea	-3,584	-3,921	-3,931	-3,711	-3,785	-4,083	-4,075	-3,870
10 grain crops	2,080	2,713	2,930	2,285	2,099	2,469	2,302	2,411
11 products of the flour-grinding industry	-0,060	0,789	0,834	0,536	0,106	0,447	0,929	0,512
12 seeds and fruits of oilseeds	1,517	1,291	1,381	1,258	0,913	0,720	0,924	1,143
13 shellac is natural	-4,382	-5,201	-4,615	-3,993	-4,379	-4,552	-4,554	-4,525
14 vegetable materials for making	1,130	0,590	1,089	0,096	-0,262	-1,497	2,606	0,536
III. 15 Fats and oils of animal or vegetable origin	1,390	0,639	0,912	1,212	1,279	1,472	1,430	1,191
IV. Ready food products	-0,114	-0,579	-0,630	-0,519	-0,731	-0,702	-0,633	-0,558
16 products made from meat, fish	-1,359	-1,959	-1,385	-1,267	-1,612	-1,639	-1,681	-1,557
17 sugar and sugar confectionery	1,463	0,377	-0,021	-0,659	-0,655	0,542	0,345	0,199
18 cocoa and products thereof	0,173	-0,179	-0,262	-0,172	-0,384	-0,479	-0,543	-0,264
19 ready-made grain products	0,321	-0,047	0,101	0,159	0,020	-0,074	-0,083	0,057

The code and the name of the goods according to the Ukrainian Foreign Ministry	2009	2010	2011	2012	2013	2014	2015	On average, 2009-2015
20 products of vegetable processing	-0,094	-0,997	-0,937	-0,604	-0,896	-0,674	-0,427	-0,661
21 different food products	-1,837	-2,246	-2,219	-1,879	-1,995	-1,977	-1,694	-1,978
22 alcoholic and non-alcoholic drinks and vinegar	0,520	-0,005	0,230	-0,050	-0,796	-1,113	-1,154	-0,338
23 residues and wastes of the food industry	0,548	0,173	-0,212	0,287	0,229	0,352	0,439	0,259
24 tobacco and industrial tobacco substitutes	-1,033	-1,237	-1,412	-1,335	-1,424	-1,511	-1,172	-1,304

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The assessment of the international competitiveness of domestic agricultural raw materials and food in accordance with the commodity nomenclature of UCG FEA (24 commodity groups) made it possible to find that Ukraine is only competitive in the group "10 Cereals", which includes wheat, barley, rye, oats, corn, rice, grain sorghum , buckwheat and other cereals; fats and oils of animal or vegetable origin; seeds and fruits of oilseeds; milk and dairy products, poultry eggs; products of the flour-grinding industry; residues and waste of the food industry.

The Index of Competitive Advantages (RCAs) for the Grain Crop Group in 2009 reached 2,08, and in 2015 - 2,302. On average, during 2009-2015, the index of comparative advantages found for this group amounted to 2,411. The active development of new grain marketing markets is also supported by the fact that the State Food and Grain Corporation of Ukraine (GCU) has been included in the Register of Cereal Suppliers of the World Food Program of the United Nations (UN). This not only allows access to new markets, but also confirms the high level of confidence in the quality of Ukrainian agrarian products in the international arena. In the future, Ukraine will only strengthen its position in world markets. According to the United Nations Food Program (UNFP) forecasts, in Ukraine,

the percentage of agricultural production growth and, accordingly, exports of agricultural products by 2020 will increase by 60%.

The calculations show that the domestic agro-food complex is uncompetitive for the vast majority of food commodity groups. Thus, on average for 20092016, the index of comparative advantages found for the group "Meat and edible offal" was -1,769, for the group "Live trees and other plants" -4,499, for the group "Live animals" -3,003 , for the group "Edible fruits and nuts" -1,953, for the group "Vegetables" -0,459. Consequently, our country is characterized by a very low level of competitiveness in relation to agricultural and food products with high added value - meat, meat products, live animals, fruits and vegetables. Obviously, Ukraine has become an exporter of raw materials in the agrarian sector.

The model, two-criterion analysis of the food market "food independence-competitiveness" allows us to conduct an assessment in the context of individual product groups. In figure 3 presents a comparative analysis of commodity groups of crop production in the context of indicators of competitiveness and food independence.

Figure 3 **Indices of comparative advantages of commodity groups of crop production in 2015**
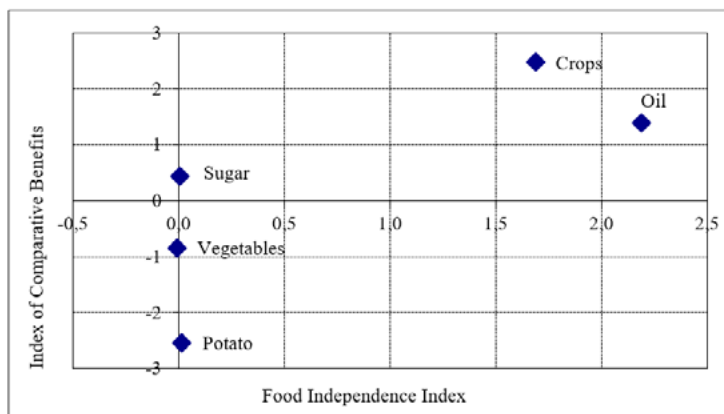
Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The first group of goods (first quadrant) includes grains and oils, because they are competitive, and the food supply of national consumers of this product exceeds the level of food independence. On average, in 2009-2015, the index

of comparative preferences for grain was 2,096, and for oil - 1,227, that is, both products have a high international competitiveness. The value of the food independence index for cereals was 1,686, and for oil - 2,118. It should be noted that the indicators of food independence for these crops are quite significant, which can not lead to the displacement of these types of products into the second quadrant. A number of types of domestic crop production were in the third quadrant. Vegetables and potatoes in 2009-2015 were insufficiently competitive even in the domestic market, which led to the loss of food independence, or the critical state of these types of products. The index of food independence for vegetables in 2015 was: - 0,009, for sugar - 0,006, for potatoes - 0,016. The index of comparative advantages for fruits was 4.69. An important fact is that in the group of crop products, it has an average competitiveness and sugar independence of food, but the excess of volumes of imports with insignificant exports displaced this group into the second quadrant.

In figure 4 presents a comparative analysis of commodity groups of livestock products in the context of indicators of competitiveness and food independence.

Figure 4 **Indices of comparative advantages of commodity groups of livestock products in 2015**
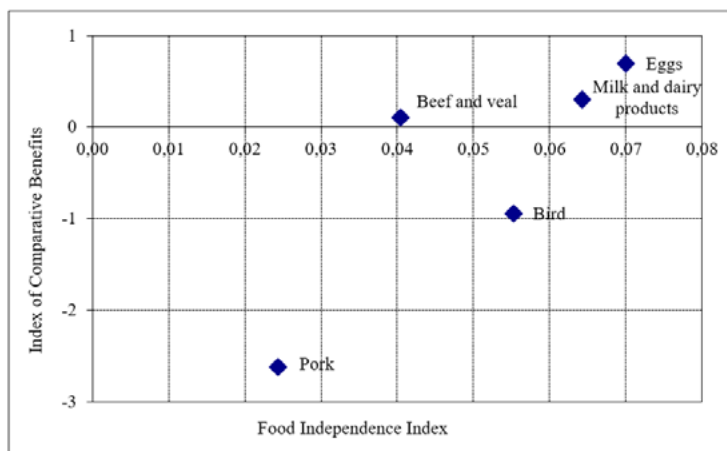
Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The presented data show that the first square forms eggs (the index of comparative advantages is 0.669, and food independence – 0,070), milk and dairy

1620

products (indexes 0.064, 0.305), beef and veal – 0.040; 0.111). At the same time, poultry and pork were uncompetitive in the domestic market with critical food insecurity. Thus, the index of food independence for poultry meat amounted to – 0,055, for pork – 0,024, and in general for meat – 0,041. The index of comparative advantages for poultry meat was -0.945, for pork -2.621, and in general for meat -1.693. It is obvious that the tools of protection and support of agriculture in 2009-2015 did not allow domestic producers in the current economic conditions to achieve international competitiveness, as well as to achieve food security above the threshold of food independent.

State support to the agrarian sector in the format of development of the marketing aspect of the green basket of the WTO, as evidenced by the practice of implementing the relevant programs of the EU and the US, is a priority direction for strengthening of competitive advantages in foreign markets [9].

At the same time, the European Commission adopted a program to support the promotion of agricultural products in foreign markets and provide information to potential consumers (The Program to Provide information on and to promote agricultural products in the European Union). The total budget of the program is 51 million euros.

In the US, a system of federal and regional marketing support programs has become widely developed, the US Department of Agriculture is structurally supported by two main lines of marketing support to the agrarian sector in domestic and international markets. The first direction is provided by the Agricultural Marketing Service, which provides marketing services to farmers, processors, distributors and consumers of agricultural products. Together with other enterprises in the industry, food quality standards are developed and maintained. The Marketing Service also manages a US Department of Agriculture product program that provides consumers with nutrition support.

The adaptation of agro-food markets of Ukraine to the conditions of globalization and the WTO from the strategic point of view should include the following development processes: advancement of advanced methods of organization of agricultural production, strengthening of scientific and technical base and comprehensive increase of competitiveness of agriculture; improvement of agricultural export policy and its diversification; developing their own strategic framework for the import of agricultural products and food; the creation of a global chain of supply of agricultural products and food and the risk minimization system that manifests itself in the world market, effective protection of the agro-food sector, the active use of the mechanisms for its protection provided by the WTO rules; the creative implementation of international experience in the development of agro-food markets, especially those countries that have recently joined the WTO, the

creation of appropriate institutional structures, sectoral organizations and associations, and ensuring their development; support and encouragement of domestic agribusiness enterprises to enter foreign markets in order to strengthen competitive positions in international markets for agricultural products and foodstuffs.

The results of the study showed that the potential of the domestic agrarian sector can satisfy the domestic needs of the population in food, within its purchasing power and form export opportunities for certain species. From the point of view of import dependence, the positions of "fish and fish products", "fruits, berries and grapes", "vegetable oil of all kinds" remain the most vulnerable positions, respectively, the share of imports by these groups in total consumption is 71.1; 48.1% and 39.1% at the 30% threshold of this indicator.

4   Conclusions

Consequently, the use of positive effects from the integration of Ukraine into the EU by Ukrainian exporters is possible only if the quality and safety of domestic agricultural products is improved and the domestic legislation is harmonized with European requirements. Today, the "perfect" legislative system of quality and food safety regulation in Poland, which combines its own requirements and EU requirements, is considered today. In Ukraine, the transition to the legislative level of the EU can last up to 10 years. However, such a transition should be gradual and planned at each level. The improvement of the legislative framework should be based on domestic achievements, taking into account the experience of the quality and safety control system in EU countries. Today, according to a number of quality indicators in Ukraine, more stringent requirements than in the EU countries, which will primarily protect the domestic market from the saturation of low-quality food products.

Estimating the cost of adapting Ukraine to the EU technical regulations through direct payments by sector is an extremely labor-intensive task that requires the collective efforts of producer associations in coordinating sectoral government bodies. In order to estimate the cost of implementing the EU sanitary and phytosanitary standards in agriculture in Ukraine, it is most appropriate to use the experience of Poland in view of the structure of its agriculture, which is dominated by small producers. Since the export-oriented branches of agriculture in Ukraine are already working according to world standards, rebuilding requires, first and foremost, industries working on the domestic market, in which the production structure is also dominated by small producers. It should be noted that in many positions (mainly rapeseed, sunflower seeds, wheat, sorghum, etc.) raw

materials are exported, while the export of finished products is more beneficial for the country.

We believe that the priority direction of the development of foreign economic orientation of the agrarian sector of Ukraine should be the improvement of the quality of products and the expansion of export potential by diversifying commodity supply with high value-added goods.

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PROCESSES OF CONCENTRATION OF AGRICULTURAL LAND VERSUS PRINCIPLES OF SUSTAINABLE DEVELOPMENT

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Abstract

For several dozen years, in the world, there have been conducted the agricultural land farm concentration processes. The speed of the changes are diversified in individual regions. The statistical data confirms the surplus concentration of the agricultural lands being in possession of a small number of businesses. In the light if the sustainable development rules, this is a not beneficial phenomenon. For the situation existing, the significant influence has the surplus capital concentration in the agriculture. In many cases, the historical and present legal regulations do not allow for development of family farms.

Keywords: *processes of concentration, farms, sustainable development*

JEL classification: *O50, Q15, Q18, R11*

1   Introduction

In the economic and agricultural references, many authors describe, in the last decade, the concentration processes of the lands being used for agricultural purposes. On the area of the European Union, it is confirmed the general trend for increasing the area of the farms in the biggest class intervals (Zdrahal & Becvarova, 2013). In addition, for the comparison purposes, in the global scale, there does

not exist a sufficient statistical data amount that could prove in a reliable way the real scale of the area change processes in agricultural farms (Lowder, Skoet & Raney, 2015). In accordance with the authors, the comparative data refers to the period after 1960. This is confirmed by the data of the World Bank in the section on „The number and surface area of the agricultural farms". In most cases, the detailed analysis referring to the division of the production entities is not possible.

The Eurostat databases make it possible to consider in detail the land concentration processes in the member states. A significant fact is that the data of the full registrations appears with a considerable delay and is prepared after several years. It is assessed that, in the world, there operates more than 570 million farms including 500 million small ones of the area up to 2 ha (Wiggins, 2010). On the other hand, Sarah (2014) presents this number lower, on the level of 475 million. The global FAO data (2013) indicates that, for a sample of 106 countries around the world, in 1930-2000, the mean farm surface decreased; however, this refers mainly to the countries of Africa while an increase was noted in the USA, Canada, Argentina, Uruguay and new Zealand. In addition, it was observed that the higher mean value of the farms occurs in countries of a higher GNP *per capita* where the farms of the area above 20 ha possess 70% of all arable lands (Adamopulos & Restuccia, 2014).

A specific object of interest of the land concentration processes should become the European Union. In accordance with the Resolution of the European Parliament (EP, 2017) concerning the current state of the agricultural land concentration in UE, the areal structure of European agricultural farms is close to that existing in Brazil, Columbia and Philippin. In addition, in a high disproportion, there remains the redistribution of the areal payments from which the entities of the higher areas have made use mainly. In the light of low proposal and regulations in 2015 the United Nations General Assembly introduced the resolution „Transforming our world: the 2030 Agenda for Sustainable Development" (UN, 2015). The Agenda was created to enchance „actions for people, planet and prosperity". The rules were collected in 17 Sustainable Development Goals and 169 targets.

All countries agreed to cooperate and work against poverty and hunger, protecting the planet from environmental degradation and promoting prosperity and peace through international partnerships. The processes of agriculture land concentration means that the small numer of companies and actors control larger and larger areas through implementation of agricultural intensive production models. Large scale farming versus small scale farming is in oposition with United Nations Sustainable Development Goals – especially with good health and wellbeing, reduced inequalities and responsible consumption and production.

From the information contained in the European Parliament document, Extent of Land Grabbing (Kay, 2015) in many countries, redemption and hire of agricultural lands by businesses with a share of the foreign capital happened. In Poland, in 1995-2005, the foreign Affairs and Administration Ministry registered purchase, by foreigners, of the surface area of 1400 ha. Actually, in the West Pomerania Province only, the farmers signalise purchase and hire of ca. 400 000 ha by foreigners. Research carried out by Berbeka (2005) proved that in 2004, more than half of the sample of 644 entities, indicated the redemption or hire of the agricultural lands by the foreign capital, including those by "so called substituted persons". The Act limiting, partially, the liberal turnover of the agricultural lands appeared in Poland in 2016 when, in the National Treasury Resources, there remained a relatively small area of earth.

2   Data and Methods

In the paper, an attempt has been made to assess the agricultural land concentration phenomenon in Europe and the United States of America. To evaluate the degree of the earth concentration processes in the European Union member states, a land concentration index was used: the share of the number and surface area of the farms in the interval above 100 ha, UAA, in the general number and surface area of all farms.

3   Results and Discussion

In the area of 28 Member States of the European Union, in 2013[1] there operated more than 10,8 million agricultural farms (of which, more than 6 million fell to Romania, Poland and Italy), possessing more than 174.3 million ha (Table 1). The biggest surface areas felled to the Czech Republic – 133 ha, Slovakia and United Kingdom. The highest labour resources were noted in Romania, Poland and Italy while the highest locations with regard to the production value were taken by France, Germany and Italy, respectively. The biggest resources of the arable areas are under disposal of, in the decreasing order: France, Spain, United Kingdom and Germany.

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[1]   latest available data.

Table 1 **Key farm variables by country in 2013**

Specification	Number of farms (1 000)	Utilised agricultural area - UAA (1 000 hectares)	Livestock units - LSU (1 000 LSU)	Labour force* (1 000 AWU)	Standard output (EUR million)	Average area of farm (hectares)
EU-28	10 841,0	174351,0	130319,5	9345,0	331568,1	16,1
Belgium	37,8	1307,9	3 584,4	56,7	8 406,7	34,6
Bulgaria	254,4	4650,9	1 024,9	320,2	3 335,7	18,3
Czech Rep.	26,3	3491,5	1 728,4	105,1	4 447,0	133,0
Denmark	38,8	2 619,3	4 133,4	54,5	9 580,2	67,5
Germany	285,0	16 699,6	18 406,9	522,7	46 252,0	58,6
Estonia	19,2	957,5	310,1	22,1	676,3	49,9
Ireland	139,6	4 959,5	5 929,4	163,7	5 012,5	35,5
Greece	709,5	4 856,8	2 143,0	463,9	8 070,0	6,8
Spain	965,0	23 300,2	14 501,7	813,6	35 978,9	24,1
France	472,2	27 739,4	21 871,3	724,7	56 914,2	58,7
Croatia	157,5	1 571,2	864,0	175,1	2 029,1	10,0
Italy	1 010,3	12 098,9	9 374,3	816,9	43 766,6	12,0
Cyprus	35,4	109,3	174,5	16,6	495,4	3,1
Latvia	81,8	1 877,7	486,0	82,1	990,0	23,0
Lithuania	171,8	2 861,3	838,8	144,8	1 919,2	16,7
Luxembourg	2,1	131,0	165,4	3,5	313,8	63,0
Hungary	491,3	4 656,5	2 259,1	433,7	5 577,7	9,5
Malta	9,4	10,9	34,9	4,5	96,8	1,2
Netherlands	67,5	1 847,6	6 602,1	153,3	20 498,1	27,4
Austria	140,4	2 726,9	3 439,1	111,2	5 671,2	19,4
Poland	1 429,0	14 409,9	9 164,4	1918,6	21 797,5	10,1
Portugal	264,4	3 641,6	2 035,5	323,5	4 509,0	13,8
Romania	3 629,7	13 055,9	4 975,3	1552,6	11 989,6	3,6
Slovenia	72,4	485,8	488,0	82,5	1 009,2	6,7
Slovakia	23,6	1 901,6	644,8	50,6	1 812,2	80,7
Finland	54,4	2 257,6	1 145,7	27,4	3 349,2	41,5
Sweden	67,2	3 028,6	1 711,7	31,1	5 132,7	45,1
Un.Kingdom	185,2	17 096,2	13 282,3	170,2	21 937,1	92,3

Specification	Number of farms (1 000)	Utilised agricultural area - UAA (1 000 hectares)	Livestock units - LSU (1 000 LSU)	Labour force* (1 000 AWU)	Standard output (EUR million)	Average area of farm (hectares)
Norway	43,7	987,1	1246,6	44,0	3424,7	22,6

* Labour force directly employed on the farm.
Source: Eurostat. (2015). *Farm structure survey 2013* [statistics]. Available from Eurostat Data database.

In 28 member countries of European Union, the least farms in the class interval up to 2 ha of the arable are constituted 44% of the share (Table 2). The biggest production entities – above 100 ha – constituted only 3.1% of the general population. The average production entities (20-100 ha) are the 11% share in the number. In the absolute scale, the highest number of the big farms operated in France, Spain and United Kingdom, while the of the smallest ones – in Romania, Greece and Hungary.

Table 2 **Agricultural holdings by size of holding and by country in 2013**

Specification	Total	Size of holdings (in hectares of agricultural area)			
		<2	2-5	5-10	10-20
EU-28*	10 708	4 707	2 310	1 285	900
Share of UE-28 (in %)	100,0	44,0	21,6	12,0	8,4
Belgium	37 340	1 600	3 460	4 980	6 840
Bulgaria	244 850	183 640	27 810	10 880	6 780
Czech Rep.	25 950	2 700	1 880	4 940	4 610
Denmark	37 370	310	870	7 750	6 870
Germany	282 160	12 010	9 720	44 580	59 020
Estonia	18 740	1 770	4 140	3 970	3 340
Ireland	139 560	380	7 390	15 610	34 200
Greece	703 600	358 970	179 470	86 520	45 560
Spain	944 310	253 410	232 440	140 780	110 800
France	463 710	51 590	56 280	41 090	44 770
Croatia	157 090	60 700	48 220	24 690	12 610
Italy	1009 4*	277 910	313 930	172 900	114 850

Specification	Total	Size of holdings (in hectares of agricultural area)			
		<2	2-5	5-10	10-20
Cyprus	35 160	26 310	5 260	1 770	900
Latvia	80 710	17 630	16 150	16 090	15 790
Lithuania	171 720	24 250	67 100	38 440	20 070
Luxembourg	2 060	180	140	190	170
Hungary	453 090	334 760	42 550	25 550	20 160
Malta	9 010	7 600	1 110	250	40
Netherlands	65 790	6 930	9 860	9 400	10 060
Austria	139 610	14 580	27 670	24 430	30 290
Poland	1 421*	326 140	444 220	308 200	208 990
Portugal	263 580	121 860	68 450	31 310	18 360
Romania	3 563*	2 590*	691 260	193 870	49 650
Slovenia	72 270	18 360	24 810	17 260	8 190
Slovakia	22 040	5 910	6 450	2 860	2 220
Finland	54 140	880	2 150	6 130	11 050
Sweden	66 450	700	6 320	15 830	13 600
Un.Kingdom	181 690	4 080	8 240	27 250	28 550
Norway	42 120	900	3 490	7 570	12 060

Specification	Total	Size of holdings (in hectares of agricultural area)			
		20-30	30-50	50-100	≥ 100
EU-28*	10 708	382	394	391	336
Share of UE-28 (in %)	100,0	3,6	3,7	3,7	3,1
Belgium	37 340	4 930	6 810	6 530	2 190
Bulgaria	244 850	3 210	3 410	2 960	6 160
Czech Rep.	25 950	2 360	2 370	2 460	4 630
Denmark	37 370	3 950	4 360	5 380	7 880
Germany	282 160	28 920	42 530	50 220	35 160
Estonia	18 740	1 400	1 180	1 150	1 790
Ireland	139 560	24 570	30 290	20 350	4 770
Greece	703 600	15 080	11 120	5 430	1 450
Spain	944 310	51 550	53 550	49 960	51 820

Specification	Total	Size of holdings (in hectares of agricultural area)			
		20-30	30-50	50-100	≥ 100
France	463 710	31 610	47 440	93 330	97 600
Croatia	157 090	3 880	3 030	2 610	1 350
Italy	1009 4*	44 690	39 870	30 180	15 100
Cyprus	35 160	310	290	210	110
Latvia	80 710	5 320	4 140	2 700	2 890
Lithuania	171 720	6 520	5 560	5 100	4 680
Luxembourg	2 060	120	210	600	450
Hungary	453 090	8 350	7 490	6 590	7 640
Malta	9 010	10	0	-	-
Netherlands	65 790	6 890	10 980	9 280	2 390
Austria	139 610	16 680	14 660	8 730	2 570
Poland	1 421*	62 040	40 440	20 570	10 950
Portugal	263 580	6 750	6 150	4 660	6 040
Romania	3 563*	10 260	8 470	7 260	13 080
Slovenia	72 270	2 050	1 070	420	110
Slovakia	22 040	770	730	790	2 310
Finland	54 140	8 230	10 670	10 560	4 470
Sweden	66 450	6 590	7 330	8 110	7 970
Un.Kingdom	181 690	17 460	23 310	32 250	40 550
Norway	42 120	7 690	6 540	3 230	640

* in thousands of hectares of agricultural area
Source: Modified data on the basis of Eurostat. (2015). Farm structure survey 2013 [statistics]. Available from Eurostat Data database.

The smallest area entities, up to 2 ha, in the European Union member states, covered only 2% of the arable area surface (Table 3) while the biggest – above 100 ha – somewhat less than 52%, while the average ones (20-100 ha) constituted a 29% share in the characteristic.

Table 3 **Utilised agriculture area by size of the holding (UAA) and by country in 2013**

Specification	Total	Size of holdings in hectares of utilised agricultural area			
		<2	2-5	5-10	10-20
EU-28*	175 635	3 577	7 325	8 995	12 615
Share of UE-28 (in %)	100,0	2,0	4,2	5,1	7,2
Belgium	1 306*	Spec	12 170	36 570	99 700
Bulgaria	4 651*	100 990	82 930	73 280	92 980
Czech Rep.	3 491*	2 390	5 920	34 790	64 040
Denmark	2 619*	170	3 100	55 770	98 500
Germany	16 726*	12 090	32 580	325 770	886 190
Estonia	957 510	2 430	13 830	28 470	47 540
Ireland	4 959*	2 770	26 810	118 300	510 140
Greece	4 857*	295 870	551 940	584 440	616 800
Spain	23 300*	280 730	738 150	997 130	1 543*
France	27 739*	47 530	185 980	293 570	636 720
Croatia	1 571*	55 550	155 010	171 950	174 560
Italy	12 099*	382 230	995 470	1 207*	1 586*
Cyprus	109 330	17 720	16 100	12 250	12 240
Latvia	1 878*	14 690	54 530	116 980	219 630
Lithuania	2 861*	35 980	215 860	268 870	279 900
Luxembourg	131 050	120	510	1 370	2 410
Hungary	4 657*	115 000	133 860	179 070	280 500
Malta	10 800	5 080	3 410	1 670	490
Netherlands	1 847*	7 520	33 600	67 840	146 110
Austria	2 727*	17 160	90 650	178 250	437 650
Poland	14 410*	438 070	1 442*	2 180*	2 882*
Portugal	3 642*	125 350	213 700	218 670	255 860
Romania	13 056*	1 584*	2 141*	1 295*	653 930
Slovenia	485 760	20 810	81 110	120 630	111 340
Slovakia	1 902*	6 740	20 550	19 870	32 370
Finland	2 282*	460	7 630	46 160	163 570
Sweden	3 036*	440	25 910	112 420	195 200

Specification	Total	Size of holdings in hectares of utilised agricultural area			
		<2	2-5	5-10	10-20
Un.Kingdom	17 327	3 770	28 840	194 430	412 020
Norway	996 270	880	12 080	54 960	173 740

Specification	Total	Size of holdings in hectares of utilised agricultural area			
		20-30	30-50	50-100	≥ 100
EU-28*	175 635	9 327	15 227	27 479	91 086
Share of UE-28 (in %)	100,0	5,3	8,7	15,6	51,9
Belgium	1 306*	122 020	265 740	450 220	319 600
Bulgaria	4 651*	75 980	130 600	203 680	3 890*
Czech Rep.	3 491*	56 680	90 730	171 470	3 065*
Denmark	2 619*	97 610	168 730	387 500	1 808*
Germany	16 726*	718 320	1 660*	3 550*	9 541*
Estonia	957 510	34 510	46 040	80 610	704 080
Ireland	4 959*	607 410	1 177*	1 365*	1 152*
Greece	4 857*	357 080	411 870	349 740	1 689*
Spain	23 300*	1 256*	2 044*	3 502*	12 939*
France	27 739*	777 240	1 878*	6 751*	17 169*
Croatia	1 571*	92 310	113 630	178 850	629 350
Italy	12 099*	1 084*	1 523*	2 062*	3 259*
Cyprus	109 330	7 440	10 700	14 380	18 500
Latvia	1 878*	129 390	159 040	187 120	996 340
Lithuania	2 861*	157 280	215 720	353 580	1 334*
Luxembourg	131 050	2 870	8 460	44 880	70 430
Hungary	4 657*	201 970	287 250	458 280	3 000*
Malta	10 800	150	0	-	-
Netherlands	1 847*	171 360	431 330	620 620	369 190
Austria	2 727*	407 630	561 710	586 040	447 800
Poland	14 410*	1 496*	1 534*	1 393*	3 044*
Portugal	3 642*	163 260	234 440	322 840	2 107*
Romania	13 056*	247 980	326 490	506 200	6 300*
Slovenia	485 760	49 800	40 060	27 930	34 080

Specification	Total	Size of holdings in hectares of utilised agricultural area			
		20-30	30-50	50-100	≥ 100
Slovakia	1 902*	18 800	28 190	56 480	1 719*
Finland	2 282*	202 050	425 930	731 750	704 850
Sweden	3 036*	163 630	281 090	580 110	1 677*
Un.Kingdom	17 327	435 230	920 510	2 329*	13 003*
Norway	996 270	193 250	253 130	214 610	93 620

* in thousands of hectares of utilised agricultural area
Source: Modified data on the basis of Eurostat (2015). Farm structure survey 2013 [statistics]. Available from Eurostat Data database.

To evaluate the degree of the earth concentration processes in the European Union members states, a land concentration index was used: the share of the number and surface area of the farms in the interval above 100 ha, UAA, in the general number and surface area of all farms. From the listing in Table 4, it follows that the agricultural land area was characterised by a high earth concentration degree. Over 3% of the population under investigation possessed over a half of the arable areas. The actual state presents to a quite different areal structure than in Asiatic countries – mainly China and India where more than 80% of the lands is possessed by small farms, up to 2 ha. However, the processes of excessive concentration of agricultural lands were emphasised in the Czech Republic, Slovakia and Bulgaria. Among the countries of the "old" EU-15, a notice is worth to France, Denmark and United Kingdom where the share of the farms biggest with respect of their number is relatively high.

Table 4 **Land concentration in Europe Uunion countries**

Specification	Agri-cultural holdings > 100 ha	Total holdings	% of holdings	UAA of agricultural holdings >100 ha (in ha)	EU total UAA	% of Country total UAA
EU-28	336 750	10 708 870	3,1	91 086 430	175 635 220	51,9
Belgium	2 190	37 340	5,9	319600	1306020	24,5
Bulgaria	6 160	244 850	2,5	3890500	4650940	83,6
Czech Rep.	4 630	25 950	17,8	3065450	3491470	87,8
Denmark	7 880	37 370	21,1	1807950	2619330	69,0

Specification	Agri-cultural holdings > 100 ha	Total holdings	% of holdings	UAA of agricultural holdings >100 ha (in ha)	EU total UAA	% of Country total UAA
Germany	35 160	282 160	12,5	9541330	16726580	57,0
Estonia	1 790	18 740	9,6	704080	957510	73,5
Ireland	4 770	139 560	3,4	1151830	4959450	23,2
Greece	1 450	703 600	0,2	1689050	4856790	34,8
Spain	51 820	944 310	5,5	12938810	23300220	55,5
France	97 600	463 710	21,0	17169550	27739430	61,9
Croatia	1 350	157 090	0,9	629350	1571210	40,1
Italy	15 100	1 009 430	1,5	3258910	12098890	26,9
Cyprus	110	35 160	0,3	18500	109330	16,9
Latvia	2 890	80 710	3,6	996340	1877720	53,1
Lithuania	4 680	171 720	2,7	1334060	2861250	46,6
Luxembourg	450	2 060	21,8	70430	131050	53,7
Hungary	7 640	453 090	1,7	3000580	4656510	64,4
Malta	-	9 010	-	0	10800	-
Netherlands	2 390	65 790	3,6	369190	1847570	20,0
Austria	2 570	139 610	1,8	447800	2726890	16,4
Poland	10 950	1 421 550	0,8	3043780	14409880	21,1
Portugal	6 040	263 580	2,3	2107480	3641600	57,9
Romania	13 080	3 563 770	0,4	6300460	13055840	48,3
Slovenia	110	72 270	0,2	34080	485760	7,0
Slovakia	2 310	22 040	10,5	1718610	1901610	90,4
Finland	4 470	54 140	8,3	704850	2282400	30,9
Sweden	7 970	66 450	12,0	1677120	3035920	55,2
Un.Kingdom	40 550	181 690	22,3	13003120	17326980	75,0
Norway	640	42 120	1,5	93620	996270	9,4

Source: Own calculation on the basis of Eurostat (2015). Farm structure survey 2013 [statistics]. Available from Eurostat Data database.

In the USA, there dominate the family farms (Hoppe, 2014), the average surface area of which have amounted to 435 acres in 2013. In not family farms, the mean surface area amounted to 1547 acres and they constituted an equivalent of European high area farms. From the data contained in Table 5, it follows that the

share of the farms in the class interval above 80 ha (200 acres) is the most close to the actual state in the Czech Republic and Denmark as well as in the United Kingdom. In spite of the dominating position of family farms in the USA, the land concentration processes are also advanced – however, the specificity of the European and American agriculture should take into consideration the specific considerations, in particular the technological, economic, historical and social ones.

Table 5 **The size distribution of US farms**

Specification	Size class	1-9	10-49	50-99	100-199	200-499	500-999	1000-1999	>2000	% of holdings area >200 acres
				Size of holdings in hectares of utilised agricultural area						
2001	number	11,2	32,5	16	15,1	13,4	6,1	3,9	1,7	25,1
2001	area	0,2	3,5	4,7	8,8	17,8	18,2	22,7	24,1	82,8
2011	number	15,8	35,7	14,9	11,4	11,1	5,6	3,4	2,2	22,3
2011	area	0,3	3,7	4,4	6,5	14,6	16,8	19,4	34,3	85,1

Source: MacDonald, J. M., Korb P., Hoppe R.A. (2013). Farm Size and the Organization of U.S. Crop Farming. Retrieved from https://www.ers.usda.gov/webdocs/publications/45108/39359_err152.pdf

The land concentration processes are of direct impact on the redistribution of the areal payments within the framework of the Common Agricultural Policy. In the light of the sustainable development, the most problematic seems to be the areal payment redistribution, realised from the public resources within the framework of the Common Agricultural Policy. In accordance with the data of DG Agriculture and Rural Development (2014), for 20% of the biggest agricultural farms, there fall the direct payments on the level of more than 80% of their total finance envelope. The maximum payment limit introduced in the last period (called *capping*), does not probably, meet the expectations of this initiative. From the data of the Extent of Farmland Grabbing in the UE (2015) study, it follows that, in Romania, in 2013, 51.7% funds found their way to WPR beneficiaries and, respectively, in Bulgaria, 45.6% of the total financial envelope. In Italy, a country of a fragmented agriculture, for 0,8% of the farm population, 26.3% funds fell. The situation that happened refers to the high-area entities, of the surface area above 300-500 ha.

4 Conclusion

The statistic data being gathered and published for European Union (28 members) and the USA confirm the significant concentration of the agricultural land areas in hands of a small number of businesses. The situation that has happened is, most often, of slow areal changes in long time intervals. However, some considerations – in particular the legal ones and those referring to the agricultural land turnover on the area of EU member states – made it possible for relatively fast and often uncontrolled transfer of lands to high-area farms. Too late publication of statistic data and gaps in the law enabled excessive, in many cases, concentration of land and capital in the agriculture sector.

Bothe European and American agriculture and rural area development model, in accordance with the strategic documents, should happen at the maximum possible share and with maintenance of the interests of the family farms. In the opinion of the authors, the instruments (legal, first of all) avoiding excessive land concentration with a result not beneficial for small and medium farms. The changes that have happened in the past are not compliant with the Sustainable Development Rules and may result in unforeseeable and not beneficial social phenomena. The next financial perspective should be legitimated with a significant decrease of the financial means for big agricultural farms making use of the scale effect, for the benefit of stabilisation of operation of the small and medium family farms.

Acknowledgements

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AGRICULTURAL LAND AND POLAND'S MEMBERSHIP IN THE EUROPEAN UNION – AN ATTEMPT TO ANALYZE BASED ON THE LEGISLATION OF THE REPUBLIC OF POLAND

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Abstract

Due to a multifunctional character of land, including agricultural land, the European Union member states introduce to their internal legislation provisions hindering or preventing foreigners from purchasing it. On her accession to the European Union in 2004, Poland negotiated a very long, covering 12 years, period of ban on agricultural land sales to foreigners. However, some cases of granting permission to purchase property to foreigners were noted during this period. Owing to experiences of other countries and because of the danger of strengthening speculative practises on the market, new regulations governing the agricultural land turnover entered into force in 2016. As has been presented by statistical data, the provisions efficiently cut of the access to Poland's land for foreigners, but also for some Polish citizens. The paper presents an analysis of new regulations and an attempt at finding the answer to the question whether the legislator's decision was fully compliant with the primary legislation of the European Union.

Keywords: *land ownership, law reform, civil law*

JEL classification: *K11, K12, K15, Q15*

1   Introduction

Land is treated all over the world as particular wealth. It also applies to agricultural land, i.e. the land intended for agricultural production. Because of the land, its value in itself, resources and potential it hides, as well as human needs it allows to realize, wars have been and are wagered or long time litigations have been conducted.

Poland has been the European Union member state since 2004. The European Union is an international formation, whose priority is economic cooperation of its member states. Agriculture is one of important sectors of economy. Art. 38, par. 1 of the Treaty on the Functioning of the European Union (further: TFEU) states that the EU determines and realizes common agricultural and fisheries policy. Art. 39 TFEU determines the goals of common agricultural policy. These include, among others, productivity of agriculture, optimal utilisation of agronomic inputs (including agricultural land), ensuring decent life for rural dwellers and reasonable prices for goods delivered to consumers. Concerning the agricultural land, the EU focuses on sustainable agriculture which guarantees the economy, which will not lead to environmental losses. On the other hand, Art. 40 of TFEU regulates common organization of agricultural markets, where common rules of competition apply allowing to exclude the instances of discrimination among producers or consumes. In compliance with Art. 42 of TFEU, the Council upon request of the Commission may allow to grant assistance for protection of farms in disadvantaged position due to structural or natural conditions.

Upon Poland's accession to the EU in 2004 the principles of property turnover in general and agricultural land in particular changed fundamentally. The determinants of these changes in the first place result from the freedoms guaranteed by the primary Union law and from the requirements of the EU legislation concerning sustainable agriculture. Not without importance is also the issue of maintaining the competitiveness of Polish farms towards the farmers from so called "old Union". The latter reason became crucial in the light of area structure of Polish farms. From this point of view it became necessary to ensure the possibility of land consolidation and maintaining land in the hands of Polish farmers, as well as to protect Polish agricultural land market against speculative behaviours.

Poland's accession to the EU caused a real concern of Polish authorities against the uncontrolled buying of Polish land by richer countries of the "old" European Union. The fear felt by Polish authorities resulted from the experiences of other member states and comparing the prices of agricultural land in various countries, as shown in Figure 1.

Therefore, in order to maintain public order and safety, some measures were undertaken to prevent this process. However, the applied legal regulations (12-year period of ban on land sales to foreigners negotiated in the EU Accession Treaty, a system of permissions for land acquisitions and a change of land use) must be compliant with the European law. Solid jurisprudence of the Court of Justice states unanimously that all restrictions imposed on property acquisitions constitute a restriction on the fundamental freedoms stated in the Treaty on the Functioning of the European Union (Art. 45 TFEU, Art. 49 TFEU), capital flow (Art.63 of TFEU) and is an infringement of the prohibition of discrimination on grounds of nationality (Art.18 of TFEU, Art. 21 KPP). The restriction takes place irrespective of the fact whether land purchase is done for speculation or investment reasons or for the own needs (C-423/98, Lange, 2004). The statements above are the reference for the national regulations. On the other hand, the provisions governing agricultural land acquisitions are of crucial importance for the possibility of rational and sustainable agricultural activities. In this context, the rules in question are in dilemma between the two values: protection of freedoms guaranteed by the treaty and requirements of sustainable agriculture development.

From a legal point of view, the land is a thing, and more specifically a property (Art. 46 of Civil Code Act: further KC) (Ustawa Kodeks cywilny, Dz.U. 1964 nr 16 poz. 93). The term should be obviously connected with impossibility of moving it to a different place. Over the years the law defined the kinds of legal relationships which may bind a thing with a person in whose power the thing remains and differentiated the ownership and possession. Whereas the ownership is law, from the legal point of view the possession means only some factual situation (art. 336 KC). The property owner may be indicated by a land and mortgage resister kept for the property, obviously if it was established for this property, whereas the possessor is always a person who at a given moment is entitled to actual control over the thing. Therefore, the possessor does not have to be the owner, the same as the owner does not necessarily have to exercise control over his thing, i.e. be its possessor (art. 222 KC). This in turn may be either independent or dependant possession (art. 336 KC). The difference between them lies in the fact, that only dependant possession is formed on the basis of legal relationship which joins the possessor with the owner. An example of dependant possession is a lease agreement (art. 693 KC). During the contract period the leaseholder remains the property owner, whereas the lessee is a dependant possessor. On the other hand, independent possession means actual power exercised over a thing corresponding to the content of property law. Only independent possession leads to prescription, i.e. a take-over of the ownership of a thing after a certain period of time. For the needs of presented paper, the terms of possession and possessor will denote each

person actually exercising control over a property (i.e. possessor, owner, perpetual usufructuary, leaseholder, etc.) According to the basic definition (art. 46¹ KC), the agricultural property (or agricultural land) is a property which is or may be used for productive activities in agriculture in the area of crop and livestock production, not excluding horticultural, fruit and fish production.

From the economic point of view, land beside labour and capital is a factor of production. In literature it is determined as multifunctional good (Wilkin 2014). It refers to various branches of economy, but particularly to agriculture. For agriculture the land, especially agricultural land is the factor enabling agricultural production, i.e. animal breeding and husbandry, crop cultivation and other farming activities (keeping gardens, orchards or fish ponds). The great value of agricultural land for the economy is best evidenced by the fact, that each case of land exclusion from agricultural use requires, in compliance with the legislator's will, conducting a special administrative procedure, according to Art.11 of the Law on protection of agricultural and forest lands (Ustawa o ochronie gruntów rolnych i leśnych, Dz.U. 1995 nr 16 poz. 78). Depending on the acreage which is to be excluded from agricultural production or on the purpose of exclusion, the procedure may be free of charge or involve really high costs, as shown in Table 1.

Table 1 **Rates for permanent exclusion of agricultural land from agricultural production**

Mineral and organic soil	The rate for permanent exclusion of land from agricultural production for [ha] in PLN
class I	437.175,00
class II	378.885,00
class IIIa	320.595,00
class IIIb	262.305,00

Source: https://www.biznes.gov.pl/opisy-procedur/-/proc/283-wylaczenie-gruntow-z-produkcji-rolniczej.

The amount which should be paid for exclusion of land from agricultural use constitutes a rate of the area and rate for permanent exclusion of land from agricultural production. Calculation of total costs of exclusion from agricultural production should also include other organizational costs and the time. Assessing the regulations one may afford to state, that the high costs are to act preventively and counteract the depletion of agricultural acreage, among others, because of food safety. Since the 90-ties of the 20th century a decrease in the number of farms has

been observed in Poland and hence the area of farmlands (Dzun, 2014). At the same a declining share of agriculture in gross national product has been noted. In the years 1989, 2007 and 2016 it was, respectively 13%, 3.7% and 2.6%.

Presented paper aims to analyse and assess selected issues concerning agricultural land connected with Poland's membership in the European Union.

The issue of the access to agricultural land, in another words the problem of agricultural land, comes to the forefront, opening Poland's agricultural land market for foreigners (both foreign physical persons and organizations). Poland negotiated, that her agricultural land market would be closed for 12 years after the accession to the European Union, which took place on 01.05.2004. Therefore, the law changed in 2016 with the objective of closing the access to Poland's agricultural land for foreigners, but paradoxically the results were felt also by some Poles.

As a background for the outlined problems the Authors used the considerations, which for the needs of the paper they entitled "dependencies between the fact of agricultural land possession and farmer behaviours connected with Poland's membership in the European Union".

2 Data and Methods

The research material of this study are the texts of legal acts of the European Union and Polish legislation dedicated to the issues of real estate trade, in particular agricultural real estate, literature on the subject, case law of the Court of Justice of the European Union and the Supreme Court of the Republic of Poland and statistical data. The results of the research were presented in a descriptive, tabular and graphic form.

3 Results

3.1 Agricultural land versus farmer behaviours

Agriculture is the sector of economy burdened with a considerable risk, such as various types of threats, i.e. environmental factors (atmospheric and climatic factors, leading to crop overproduction disaster or yield disaster), economic factors (price instability of agronomic inputs or crops), the outcomes of political decisions (e.g. introducing embargo), diseases epidemics and losses caused by pests or lack of competence among agricultural producers (leading e.g. to degrading of the natural environment).

The negative results of risk in agriculture may be reduced. One of the ways to do it is state aid called public aid, allocated as financial support for farmers.

The other ways to prevent risk include benefiting from biological and biotechnological progress, diversified directions of production and sources of income for farmer families, as well as support for acquisition of agricultural knowledge. In this context, the rules of granting State aid for farmers are of crucial importance. The EU is a homogenous market guaranteeing free flow of commodities, services, capital and people. (For the sake of presented article, free flow of capital is important, which according to the rule may be invested in any way in the area of each member state. One of the ways of investing capital may be property acquisition). Because the above-mentioned State aid might cause disturbances of the equilibrium on the common market, it must be done under control of the European Union, particularly European Commission. Except for *de minimis* aid, each case of public aid has to be reported to the European Commission, i.e. must pass the notification procedure. In case of agriculture, all instruments of public aid are contained in the Rural Development Programme (RDP). Currently implemented RDP comprising the years 2014-2020. RDP overlaps multiannual financial framework. From a legal point of view RDP is a contract determining the strategy for utilisation financial means coming partly from the EU budget and partly from the national budget allowing for the realization of the EU goals and Poland's needs. Currently various types of direct payments are realized in Poland, including area payments, the payments for agricultural practices beneficial for the climate and the environment, called the payments for greening, or the payments for young farmers. The details were stated in the Law on payments in the framework of direct support schemes (Ustawa o płatnościach w ramach systemów wsparcia bezpośredniego, Dz.U. 2015 poz. 308). The beneficiaries of the aid may be only farmers (starting or continuing farming activities) who are the possessors of agricultural lands. From this perspective possession of agricultural lands is a key premise for obtaining public aid.

3.2 Restrictions on the access to agricultural land for foreigners

The issue of property acquisitions by foreigners is not a new problem for Polish law. Currently it is regulated by the Act on property acquisitions by foreigners of 1920 (Ustawa o nabywaniu nieruchomości przez cudzoziemców, Dz.U. 1920 nr 31 poz. 178). At the same time it should be noticed that the possibility of purchasing agricultural property is a particular case of property acquisition because it concerns a particular kind of real estate (Złoto-Małolepszy, 2013). The literature of the subject indicates a catalogue of causes of limiting agricultural property turnover, including particularly the issues of national safety, food safety, protection of national heritage, limiting or control over behaviours of speculative character

concerning foreign entities and limitations and control over the scale of foreign investments (Karaszewski, Jaworek &Siemińska, 2016).

At the beginning of the discussion it should be pointed out that currently agricultural land remains in possession of private physical persons and organizational units having or not legal personality (companies, cooperatives), public organizational units with or without the legal personality and the State Treasury (ST). On behalf of ST agricultural land is under care of the National Agency for Agricultural Support . The institution was established on 01.09.2017 from the merger of the Agricultural Market Agency (AMRA) and the Agricultural Property Agency (APA). The Agricultural Property Agency was created on 15.07.2003 replacing the Agricultural Property Agency of the State Treasury and was operating based on the act on the management of agricultural properties of the State Treasury (Ustawa o gospodarowaniu nieruchomościami rolnymi Skarbu Państwa, Dz.U. 1991 nr 107 poz. 464).

As has been mentioned before, the transitory period in Poland's agricultural land turnover was planned for 12 years from the moment of her accession to the EU and finish on 30.04.2016 (Brożyna, 2006). Like other Central and East European countries, Poland did not decide for the liberalization of the regulations concerning possibilities of agricultural land purchases by foreigners (Marks-Bilska, Kisiel & Lizińska, 2017). The draft law limiting access to Poland's agricultural land for foreigners was developed several years before the end of the above mentioned transitory period and from the very beginning raised interest of farmers and other persons interested in the legal status. Polish farmers postulated continuation of the previous model, i.e. protection of Poland's agricultural land against access by foreigners, in the first place for fear of increased prices for agricultural land, which might happen after opening the land market to the foreign subjects. Analysis of agricultural land prices in the countries of the old and new European Union allows to assume, that foreign subjects would be ready to pay any price, whereas financial capacities of Polish farmers compared unfavourably with foreign farmers. The issue of agricultural land turnover in Poland is regulated by the Act on shaping the agricultural system of 2003 (further: ASAS) (Ustawa o kształtowaniu ustroju rolnego, Dz.U. 2003 nr 64 poz. 592). The act limiting access to agricultural land for foreigners was passed by Polish Parliament (Sejm) in 2015. It was a completely new version of ASAS. It was to enter into force on 01.05.2016. Finally, Polish legislator decided on a different solution and on 14.04.2016 passed and Act on suspended sale of property from the Property Stock of the State Treasury (Ustawa o wstrzymaniu sprzedaży nieruchomości Zasobu Własności Rolnej Skarbu Państwa, Dz.U. 2016 poz. 585). The act was not a new one, only the law changing the regulations already in force, among others the Civil Code, Act on

land and mortgage register, Act on management of agricultural property of State treasury and the above mentioned ASAS. At this point it should be mentioned , that the changing act was amended several months after entering into force. The cause of amendment were problems with the application of the new legislation which appeared after its entering into force, specifically legal collisions with other regulations at the moment of its entering into force.

In compliance with Art 2a ASAS, a purchaser of agricultural land may be exclusively a private farmer, who manages the farm himself and already has legal title to agricultural property (a minimum of one conversion hectare of farmlands) and its area including newly purchased land will not exceed 300ha. The area was arbitrarily included in the act of 2003. This regulation is circumvented in the first place by concluding matrimonial property agreements (prenuptial agreements). In compliance with ASAS, agricultural land purchaser must possess so called agricultural qualifications. The qualifications may be acquired through agricultural education (secondary, tertiary or postgraduate). A person who is able to prove his/her agricultural experience is also able to get these qualifications. Another requirement of ASAS is the obligation to live for at least 5 years in the commune where one of the parcels composing the agricultural holding is situated. Concerning the premise of habitation, it should be noticed, that there is nothing to prevent agricultural land purchase by a person, who so far has not managed a farm but would like to start it, therefore he/she cannot prove the required length of residence. At the same time the legislator decided that an individual farmer has no social security obligations in Agricultural Social Insurance Fund. Therefore it may be a person who pays social security contributions to Social Insurance Institution.

At this point it should be explained what the legislator understands under the term of acquisition. Acquisition may denote both unilateral legal action, such as inheritance or bequest, or bilateral, such as agreements of sale, donation, exchange and annuity contracts, or division of joint ownership, e.g. in case of division of joint property of spouses or liquidation of a company.

A novelty introduced by the act is the situation regulated by Art.2B, par.2 ASAS, which states that property purchasers cannot sell it or pass it to other entities for 10 years from the day of purchase. Simultaneously the purchaser is obliged to manage the farm into which the acquired property was included. Earlier sale is possible only due to unforeseen circumstances (independent on the purchaser, e.g. unforeseen loss of ability for the farm running) following the consent of the ordinary court of law. Although the above mentioned regulations have not been in force for long, decisions of the court on these matters have already appeared. A case quite recently analysed by the court concerned the situation where the land purchasers were the plaintiff's parents. Shortly after the property acquisition the

state of health of one of the parents got worse, so the other parent had to take care of the sick person. In this situation the parents decided to give the farm to their son, who was ready to abandon his current occupation and move to the country. The notary refused to record the agreement due to the above mentioned statutory ban on the property sale for 10 years after the purchase date. The Supreme court which analysed the case regarded the notary's decision as wrong and stated that the court's decision about an earlier disposal of the property was completely unnecessary because the property would remain in the family hands. The Supreme Court also referred to the preamble to ASAS. In the light of this regulation it should be assumed that the agreement should concern the case when the land would be purchased by a person outside the immediate heirs group (III CZP 24/17).

Previously mentioned ASAS provides in Art.2a par.3, that a transferor may without any obstacles transfer the ownership of agricultural property on local government units, State Treasury, legal persons operating on the basis of regulations on Catholic church – State relationships in the Republic of Poland, on the State relationships with other churches and religious associations and guarantying freedom of faith and conscience and family and friends including spouse, descendants, ascendants, siblings and their children, adopters and the adopted persons. The catalogue of these subjects is a closed one. In reference to the latter, it should be presumed that they do not need to have the status of individual farmer. The other exception is acquisition in result of inheritance and specific bequest or in the course of restructuring proceedings.

If a person other than the ones mentioned above (e.g. individual farmer or a relative) were to be the purchaser, or the purchase referred to the cases other than mentioned before, according to Art.2a item 4 of ASAS acquisition of agricultural property would be possible exclusively with the consent of the National Agency for Agricultural Support (NAAS). The act provides that during the five years from the act entering into force transfer of agricultural properties, which at present are the property of the State Treasury will be suspended. However, the lands, which are the property of NAAS will be leased.

The act contains also regulations referring to the tenant of transferred property. In compliance with Art.3 of ASAS, the tenant is entitled to pre-emption right of the transferred property, unless it is a local government unit, State Treasury or the person indicated above, counted among the transferee relatives. However, in Art.3 item 1 of ASAS the legislator decided that pre-emption would be possible only in case of written lease contract with certified date and the lease was realized for at least 3 years from this date and the acquired property is a part of the tenant's family farm.

These regulations raise constitutional doubts and doubts concerning their compliance with the European Union legislation. It seems that the 10-year grace period concerning property sale is a too far-reaching restriction on the property law (Art. 64 of the constitution) and conducting the economic activity Art. 22 of the constitution). Legislative Council working on Polish act stated unanimously that the above mentioned period was too long and categoric and not necessary for the protection of constitutional values (protection of agricultural system) which legitimize restriction of citizen's rights and freedoms (Bieluk, 2016). Moreover, the member states may shape the way of agricultural property acquisition by foreigners, yet the rules are assessed through cardinal principles of the EU law, i.e. European freedoms, including free capital and people flow, as well as non-discrimination principle (Fearon v. Irish Land Commission, C-182/83). At the same time the requirement of personal management of farm over such a long period of time is not essentially contradictory to the EU law, still in compliance with the jurisprudence of the Court of Justice (Ospelt v. Weissenberg, C-452/01) cannot be the absolute requirement and the domestic law must anticipate derogations from it, statutory exceptions or exemptions with the consent of the court. Otherwise, the regulation may be regarded contradictory to the EU legislation (see: Konle v. Austria, C-302/97). It seems that in this context, the exception provided in Art.2b item 3 of ASAS has been too rigidly formulated and in result may be regarded as contradictory to the EU legislation.

Finally, it should be mentioned that the provisions of the act shall not apply among others, to the sale of a land parcel of less than 0.3 ha, the properties included in Agricultural Property Stock of the State Treasury, or built-up lands with area to 0.5ha if on the day of the act entering into force they were occupied by residential buildings or buildings, constructions of appliances not used for agricultural production together with the adjoining parcels, enabling their appropriate utilisation and occupied for house garden.

The data concerning property and agricultural land acquisitions by foreigners in Poland were illustrated by Table 2 covering the years 2002-2016. Analysis of data allows to conclude that foreigners' interest in agricultural land increased after Poland' accession to the European Union. Although in 2016, i.e. in the year when the law was changed 251 decisions were issued allowing Poland's land acquisition by foreigners, including 51 documents referring to agricultural land, still the acreage which was passed into foreign hands was the smallest in history. Because of the lack of current data from the Ministry for 2017, it is still impossible to conclude whether the land turnover was effectively stopped.

Table 2 **Number of permits and purchase of real estate (including agricultural land) in [ha] by foreigners in Poland in 2002-2016**

Year	Number of permits		Area in [ha]	
	all land	agricultural land	all land	agricultural land
2002	1595	109	4884	412
2003	1580	129	4718	398
2004	1065	279	2691	761
2005	592	373	1786	1759
2006	532	274	575	532
2007	525	266	436	394
2008	514	307	1285	1253
2009	311	195	1758	1613
2010	262	180	808	800
2011	308	217	1008	1001
2012	313	218	1032	1021
2013	252	161	697	661
2014	271	166	1036	1030
2015	335	162	460	446
2016	251	51	80	65
Total	8706	3087	23254	12146

Source: Own study based on the Reports of Minister of the Interior due to the Act on the acquisition of real estate by foreigners.

Changes of agricultural land prices in private turnover in national currency in Poland in 2002-2016 have been presented in Figure 1. As results from the presented data, the price for 1 ha of agricultural land has been increasing constantly.

Figure 1 **Prices of agricultural land in private trading in Poland in 2002-2016 in PLN/ha**
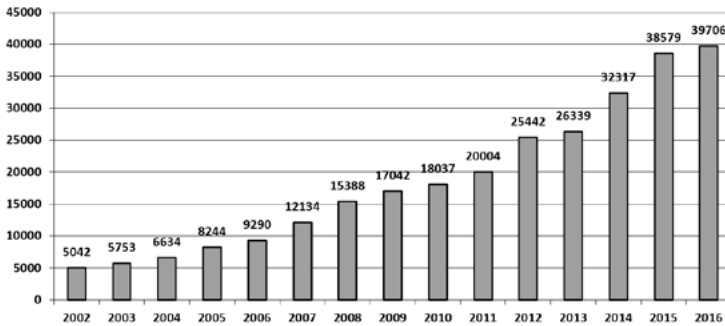
Source: Rynek Ziemi Rolniczej, 2017.

Average prices for agricultural land in selected European Union countries in 2016 in EUR/ha were shown in Figure 2. The data for Poland indicate, that the price of 1ha of agricultural land in Poland was the highest in the region, but lower than in the so called old Union countries.

Figure 2 **Average process of agricultural land in selected EU countries in 2016 in PLN/ha**
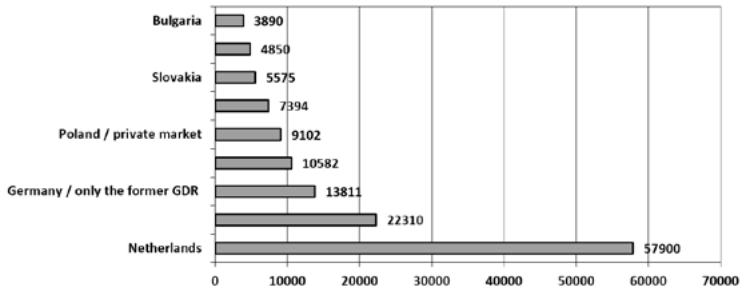
Source: Rynek Ziemi Rolniczej, 2017.

4   Conclusion

In terms of Poland's accession to the EU the obvious objective of Polish authorities became protection of Polish farms against buying up by foreign capital. The fears are justified by historical experiences of other countries, but also by the fact that for the whole period of Poland's EU membership the prices for land properties

were not equalized. Therefore, the structure of agricultural property market contains a considerable speculative potential. No unanimous answer can be given to the question whether the legal instruments discussed in the article are efficient means for achieving the above mentioned goal.

Presented statistical data allow to state that after Poland's accession to the EU, the interest of foreign capital in agricultural land purchases in Poland grew. The demand structure in this respect indicates participation of increasingly more serious players on the market, because the acreage of land transferred to foreigners increased at a decreased total number of permissions issued. Until 2016, the transitory regulations assuming a 12- year grace period in land property acquisitions by foreigners provided a guarantee against uncontrolled agricultural land acquisitions by foreigners. Such long transitory period was incompatible with the idea of European integration (Brożyna, 2006) and actually unprecedented in the EU history. The exception was Denmark's objection concerning the regulations limiting living property acquisitions irrespective of the provisions of Treaties (Protocol on the acquisition of property in Denmark). The protocol is unlimited in time, so it is valid until now (Lange, 2004). Currently, the main protection instruments are regulations concerning exclusion of agricultural land from agricultural production.

Obviously, the legal regulations presented above allow to achieve the goal which the legislator set up, i.e. efficient restriction of access to Poland's land for foreigners. Still, another result of externalisation of social costs appeared, i.e. restricted access to agricultural land for Polish citizens. Moreover, the doubt remains whether the discussed regulations are compliant with the Constitution of Poland and the EU legislation, i.e. free flow of capital and people.

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THE APPLICATION OF THE DEMATEL METHOD IN THE ANALYSIS OF FACTORS INFLUENCING THE LEVEL OF ECONOMIC AND SOCIAL INFRASTRUCTURE OF MOUNTAIN COMMUNITIES IN SOUTHERN POLAND

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Abstract

The article presents the analysis of the most significant factors determining the directions of local development with respect to social and economic infrastructure in peripheral mountain areas.

The study was based on opinions of representatives of local authorities in the Karpaty region. The results allowed for the determination of optimal directions of the development of the communities taking into account the consequences of the impact of particular infrastructural factors on the quality of life and the perspectives of living standards of the inhabitants.

Keywords: *mountain areas, development factors, DEMATEL methods*

JEL classification: *C023, R11, R55*

1   Introduction

The realization of the concept of development of the given area needs constant increase of the expenditures – not financial only – in order to improve the condition of the existing infrastructure and creating the new one both in the economic

and social sphere. The term of infrastructure is very wide and is related to many spheres of social and economic life. It has got a relatively short history and was introduced to the scientific world from the military practice (Siemiński, 1992). Generally this term denotes devices and institutions necessary for proper functioning of national economy and the life of society (Borcz, 2000).

Other definitions emphasize the complexity of infrastructural issues distinguishing the technical dimension (technical means being the indicator for economic development and the quality of life and at the same time the stimulator of any activity), and the institutional dimension (that is the institutions forming the frames of any kind of activity and the life of the society (Kapusta, 2012), included into the branches of the national economy of the nonmaterial sphere (Kupiec, Gołębiowska, Wyszkowska, 2004). The development of infrastructure was always one of the most important issues of spatial planning of the countryside (Tkocz, 1998), in the process of the development of rural areas. The infrastructure is the basis for any economic activity determining its scope, structure and spatial arrangement. Higher level of socio-economic development is the derivative of the degree of realization of the demands within infrastructure and its services (Ratajczak 2000).

The level of the development of infrastructure may determine the degree of attractiveness of the given area, villages therefore decide on the chances and barriers of their further development. Infrastructure as a factor activating the socio-economic progress is at the same time one of the most important determinants of the life in the country (Krakowiak-Bal, 2004).

In estimation of the influence of chosen factors on the condition of social and economic infrastructure one should bear in mind the significance of the features distinguishing the communities situated in mountain areas of southern Poland in comparison with the parallel administrative units located in lowlands. This individuality can be observed not only in respect to the characteristic elements of the shape of the ground determining the significant differences in the spatial, infrastructural and natural arrangement. These areas fulfill significant socio-economic functions of more than local meaning, determining many phenomena influencing the neighbour regions. There are many specific services of economic or environmental character (Musiał, 2008) connected with the presence of the mountain areas within Małopolska or Podkarpacie regions. Among the elements realized by these areas for the benefit of society one should mention the following (Czudec, 2008):

1. economic function,
2. demographic and cultural function,
3. ecological function.

The characteristic feature of many mountain communities is the high differentiation with respect to their inner constitution expressed in high level of touristic development within the areas of low parameters of economic development and at the same time the occurrence of the phenomenon of material poverty (Gorzelak, 2007). One has to remember that the basic determinant of the stability of development is the improvement of the quality of life and the increase of the economic welfare of the people (Adamowicz, 2006), which specifically concerns the periphery areas. It creates the necessity of taking into account the uniqueness of these regions in political strategy conducted by central and local governments, the elements of which should react to the process of depopulation and economic degradation (Cymanow, Florek-Paszkowska, 2015). The restriction of the processes of socio-economic marginalization of the regions under discussion needs maintaining agricultural functions in the form allowing for the development of the branches of high productivity (Dax, Hellegers, 2000), such as tourism and recreation or forestry, which will constitute a factor restricting unemployment and in further perspective may turn out to be a factor favouring migrations (Dax, Hovorka, 2004). One should remember that any activities connected with the sanation of periphery areas should be preceded by the analysis of the condition of socio-economic infrastructure taking into account the crucial factors influencing the civilization level of the areas under discussion.

The essential aim of the article is to determine the most significant factors influencing the directions of local development with respect to social and economic infrastructure of periphery areas. Basic elements determining the civilization level of the areas were identified in the study and their impact on particular components connected with the quality of life in the mountain communities was assessed. Thanks to the application of the DEMATEL method it was possible to determine the factors which have a significant influence on particular directions of the development. At the same time a useful tool was given to the local authorities allowing them to optimize the allocation of public means in the formation and transformation of socio-economic infrastructure of the units managed by them.

2 Data and Methods

For the analysis of the survey results the DEMATEL method was applied (DEcision MAking Trial and Evaluation Laboratory). It was created in the 1970s. The primary objective realized by this method was the identification of the role of the factors connected with a given phenomenon and determination of the ones that have the most significant influence on this phenomenon (Ogrodnik, 2015).

The basis of the method consists of the comparisons of pairs of the objects (factors) being analysed considering the direct influence of one on the other (Dytczak, Ginda, Gotowała, Szklennik, 2011). The discrete scale of the estimation of the relationship between the objects is applied here. The scale takes natural values from the interval from 0 to N, with the lowest level corresponding with the state of no influence of the first of the two objects being compared on the other and the highest level of the scale – N - corresponds with the extremely high level of the first factor on the other. The intermediate levels correspond with the gradual increase of the influence of the first object of the pair on the other. In the original version of the DEMATEL the scale for N = 4 was proposed, and in further research the authors modify this scale. The DEMATEL method is successfully applied because of the easy description of the models of phenomena being considered and mathematical transformations applied, in which the matrix of the direct influence is used as a starting point for further proceeding of the method. On its basis the matrix N of the total (both direct and indirect) influence) is obtained. Its elements allow for the determination of the two characteristic indicators: the position (prominence) and the relation, recognizing the character of the objects considered in the context of the role in the process of determination of the structure of influence of objects and the influence on other objects respectively. This allows to determine the degree of the total influence of objects and in consequence construct their ranking arrangement and recognize their (casual or resulting) character. The results of the analysis of the total influence may be presented in the form of a map of the total influence showing the relationships of the influence between the objects under consideration (Dytczak, Ginda, Gotowała, Szklennik, 2011). The input data for the analysis are the opinions of experts – local leaders, from the units of the territorial government. The investigation covered the period of 2015-2017. The survey was carried out within the area of 44 mountain communities (general population) classified as the Areas of Unfavourable Economic Conditions (AUC) located in the southern part of Małopolskie, Podkarpackie and Śląskie Voivodships. In the study directed towards the determination of the significance of the factors influencing the level of social and economic infrastructure of the mountain communities in southern Poland the following factors were distinguished:

- the level of education of inhabitants
- mobility of inhabitants
- access to services connected with healthcare
- access to services connected with education
- access to and sports and recreation facilities
- access to cultural goods

- easiness in own business management
- quality of technical infrastructure
- closeness to city centres
- scale of external migrations
- closeness to communication trails

Subsequently, the opinions of people governing the communities were gathered with respect to the influence of each of the mentioned factors on the others. The power of this influence was estimated by the experts in the scale of the range from 0 to 4, where 0 meant no influence at all, 1 – minor, 2 – significant, 3 – strong, 4 – very strong influence of one factor on the other.

Table 1 **The matrix M of indirect influence with the row sums**

	A	B	C	D	E	F	G	H	I	J	K	Sum
A	0	4	1	3	0	0	4	0	0	3	0	15
B	3	0	3	4	3	3	4	0	0	4	0	24
C	0	0	0	1	1	1	1	0	0	1	0	5
D	4	2	1	0	1	1	4	0	0	3	0	16
E	2	2	1	1	0	1	2	0	0	0	0	9
F	4	2	0	1	0	0	1	1	0	1	0	10
G	2	1	0	0	0	1	0	1	0	3	0	8
H	2	3	2	2	3	2	4	0	0	2	1	21
I	4	4	3	4	2	4	4	2	0	3	4	34
J	3	2	2	3	2	3	3	0	0	0	0	18
K	4	4	3	4	3	3	4	2	4	2	0	33

Source: Own investigations.

The opinions gathered were the starting point for the construction of the matrix M of the indirect influence. Out of each set of estimated of the influence of the given object on the others the number with highest frequency was chosen (the dominant) and placed in the matrix M (table 1).Further on the matrix M was normalized by the division of each element by the largest value of the row sums, which gave the matrix M' of direct and indirect relations.

Table 2 The normalized matrix M' of indirect relations

	A	B	C	D	E	F	G	H	I	J	K
A	0	0,1176	0,0294	0,0882	0	0	0,1176	0	0	0,0882	0
B	0,08824	0	0,0882	0,1176	0,0882	0,0882	0,1176	0	0	0,1176	0
C	0	0	0	0,0294	0,0294	0,0294	0,0294	0	0	0,0294	0
D	0,11765	0,0588	0,0294	0	0,0294	0,0294	0,1176	0	0	0,0882	0
E	0,05882	0,0588	0,0294	0,0294	0	0,0294	0,0588	0	0	0	0
F	0,11765	0,0588	0	0,0294	0	0	0,0294	0,0294	0	0,0294	0
G	0,05882	0,0294	0	0	0	0,0294	0	0,0294	0	0,0882	0
H	0,05882	0,0882	0,0588	0,0588	0,0882	0,0588	0,1176	0	0	0,0588	0,0294
I	0,11765	0,1176	0,0882	0,1176	0,0588	0,1176	0,1176	0,0588	0	0,0882	0,1176
J	0,08824	0,0588	0,0588	0,0882	0,0588	0,0882	0,0882	0	0	0	0
K	0,11765	0,1176	0,0882	0,1176	0,0882	0,0882	0,1176	0,0588	0,11765	0,0588	0

Source: Own calculation.

Then the matrix M' was transformed in the way described by the formula:

$$N = M'(I - M')^{-1} \quad (1)$$

which allowed for the determination of the matrix N of the direct and indirect influence (see table 3). Its elements allow for the determination the indicators

describing the kind and degree of the relationship between the factors of the structure under investigation.

Table 3 Matrix N of direct and indirect influence

	A	B	C	D	E	F	G	H	I	J	K	Sum
A	00,057	0,149	0,0575	0,1273	0,0275	0,0374	0,1746	0,0062	0,00002	0,1407	0,0002	0,778
B	00,162	0,060	0,1176	0,1659	0,1132	0,1273	0,1941	0,0095	0,00003	0,1786	0,0003	1,129
C	0,019	0,013	0,0064	0,0387	0,0345	0,038	0,0449	0,0024	0,00008	0,0414	0,00004	0,238
D	0,165	0,101	0,0544	0,0438	0,0499	0,0604	0,1733	0,0069	0,00002	0,1376	0,0002	0,792
E	0,087	0,081	0,0431	0,0526	0,0122	0,0455	0,0914	0,004	0,00001	0,0327	0,00010	0,449
F	0,149	0,091	0,0209	0,0633	0,0176	0,0215	0,0775	0,0324	0,00010	0,069	0,0010	0,545
G	0,088	0,056	0,0174	0,0287	0,0158	0,0491	0,037	0,032	0,00010	0,1123	0,001	0,437
H	0,130	0,141	0,0925	0,1113	0,1176	0,1008	0,1911	0,0106	0,00354	0,1219	0,0301	1,059
I	0,246	0,220	0,1534	0,2175	0,1197	0,194	0,2586	0,0801	0,01430	0,2012	0,1217	1,827
J	0,145	0,103	0,0819	0,1266	0,078	0,1155	0,1485	0,0078	0,00002	0,0554	0,0002	0,861
K	0,241	0,217	0,1518	0,2139	0,1438	0,1653	0,255	0,0792	0,11958	0,1725	0,0164	1,776
Sum	1,488	1,233	0,7971	1,1896	0,7299	0,9547	1,646	0,2711	0,1377	1,2633	0,1712	

Source: Own calculation.

The transformed values of the row and column sums of the matrix N determine the indicators of the relationships that identify the role of each of the analyzed factors that is those that achieve positive value of the relationship show the most dominant (casual) character. This means that their influence on other factors of the structure in the highest degree. On the other hand, the factors that achieve negative values of the relationship indicator show the resulting character and are the consequence of the impact of other factors under investigation (Dytczak, Michnik, Ogrodnik, 2014).

3   Results and Discussion

The results presented in table 4 and in the form of a meaning – relationship map (Figure 1) prove the important role of peripheral communities with respect to the superior units, that are sup-regional centres of economic development.

Table 4 **Values of indicators of relationship and meaning**

	Row sums R_i	Column sums C_i	Indicator of meaning $R_i + C_i$	Indicator of relationship $R_i - C_i$	Factor character
1. The level of education of inhabitants	1,7783592	2,4881314	4,26649058	-0,709772	result
2. Mobility of inhabitants	2,1291777	2,2330323	4,362209942	-0,103855	result
3. Access to services connected with healthcare	1,2377725	1,7971401	3,034912643	-0,559368	result
Access to services connected with education	1,7922355	2,1896071	3,981842549	-0,397372	result
4. Access to sports and recreation facilities	1,4489391	1,7298606	3,17879969	-0,280921	result
Access to cultural goods	1,5444784	1,9546748	3,49915319	-0,410196	result
5. Easiness in own business management	1,4371848	2,6460395	4,083224345	-1,208855	result

	Row sums R_i	Column sums C_i	Indicator of meaning $R_i + C_i$	Indicator of relationship $R_i - C_i$	Factor character
Quality of technical infrastructure	2,0496261	1,2711409	3,320766984	0,7784852	reason
6. Closeness to city centres	2,8271493	1,1377935	3,964942742	1,6893558	reason
7. Scale of external migrations	1,861428	2,2633362	4,124764165	-0,401908	Result
8. Closeness to communication trails	2,7756501	1,1712446	3,946894677	1,6044056	reason

Source: Own calculation.

The theory of core and periphery created by F. Ratzel (1896) and further developed by J. Friedmann (1968, 1974), in which the areas of high potential of development and ability to generate innovation (that is the core) and peripheries, that is regions of retardation and stagnation and in a high degree depended on the cores were distinguished. There are four basic types of regions (Bański, 2010):
1. core regions, that are the centres of industry, finance, administration with high potential of development,
2. development axes, that is the zones covering main communication route connecting two or more number of core regions,
3. frontier regions, with differentiated potential of development showing At the same time the ability for undertaking pro-development activities,
4. depressed regions, with stagnation or economic collapse and significant decrease of population size.

Figure 1 **Map of meaning – relationship**
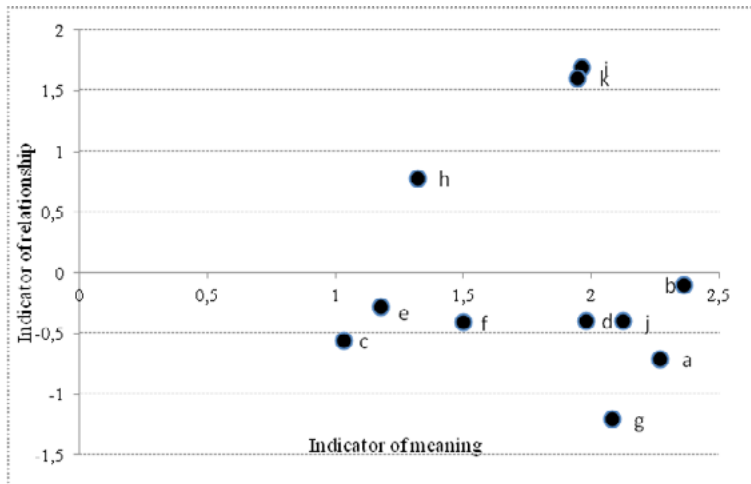
Source: Own investigations.

Apart from the element of the distance of the mountain communities from the city centres (classified as the significant development barrier) slightly lower influence in the expert estimation got the factor of the distance from communication routes. This fact is particularly important with respect to the stimulation of economic development of periphery areas (Badach, Cymanow, 2010), the location of units of minor local entrepreneurship (generally of service character) in the neighbourhood of transit routes is important not only as an element of the construction of labor market, but also by the increase in demand in the local dimension it generates additional benefits following from the occurrence of the multiplier effect. Slightly lower influence on the local development was observed in case of the existing technical infrastructure, although experts admit that this factor constitutes the fundamental basis for the construction of socio-economic potentials of the examined areas. In turn, with respect to the elements concerning the results of activities of the factors determining the level of social and economic infrastructure discussed earlier the respondents recognized the easiness of own business management as the most significant factor determining the level of social and economic infrastructure, resulting in the increase of the income following from the local taxes, allowing for the re-investment and further improvement of the conditions for the development of the entrepreneurship. Among other significant elements being the derivative of the level of infrastructure access to education services and the resulting level of education, as well as the issues of health

care, access to sports facilities and access to cultural goods were distinguished. The level of social and economic infrastructure determined in a significant degree the level of external migrations of earning character, but it turned out that his element did not influence directly the level of mobility of the inhabitants of mountain communities – in the local dimension.

4   Conclusion

The DEMATEL method is a useful tool for the identification of the role and the importance of factors concerning the investigation being considered. Its basic advantage is the simplicity of the computational procedure applied as well as the possibility of taking into account factors of differentiated character and difficult to measure. At the same time, the interpretation of results is relatively easy and clear.

The carried out analysis shows undoubtedly the key importance of the factors concerning the location of the community in relation to city centres and the closeness of communication routes as the most significant determinants influencing the level of economic and social infrastructure of the examined mountain communities.

The availability of educational services and the resulting education level of the inhabitants, as well as the scope of services concerning health care, access to sports facilities and cultural goods constitute the main result of the impact of the other analyzed factors.

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LAND PRICE AS THE MAIN FACTOR OF THE AGRICULTURAL LAND MARKET EFFECTIVE FUNCTIONING

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Abstract

The article aims to justify the methodological approaches to determining the land value, to systematize deterrents and incentive factors of a civilized land market formation in Ukraine, and to predict the tendencies of the market developmentunder lifting the moratorium on land purchase and sale in Ukraine.

Keywords: *agricultural land price, expert money and normative appraisal mortage*

JEL classification: *Q15, E37*

1   Introduction

Land pricing issues are of particular relevance in the period of land market formation and development as land becomes one of the main sources of profit under market conditions. Not any purchase act - land sale, lease, exchange andmortgage can be made without the price. Determination of the price is necessary in the land plot handing down by inheritance, feoffment, determining the contribution rate of an enterprise fund, establishing the size of the land tax, etc. Therefore, solving the problem of land pricing influences the performance of the land market functioning.

2   Data and Methods

The author used official statistics data, consulting institutions data and own research while conducting a survey of land shares owners; the data processing was carried out by economic and statistical research methods.

3   Results and Discussion

In modern society, the views on land ownership are polar: from a complete denial to an unappealable affirmation. In an open letter to Mykhailo Gorbachov Nobel prize winners in the field of economics Franco Modigliani, James Tobin, Robert Solow recommended to preserve the public ownership of land in the Soviet Union and to form state revenues through the abolition of rent for land usage [1]. Henry George formulated this opinion in the paper "*Progress and Poverty*" in 1879. A person has a natural, inherent right to the land, and all citizens have equal rights to that part of the land that is associated with its natural properties. H. George's ideas were actively supported by Leo Tolstoy, who wasn't accepting both the right to ownership of man (slavery, serfdom), and the private ownership of the land, because it is the property of all mankind. In the letters to Peter Stolypin, he repeatedly called for listening to the teachings of H. George [2].

The philosophy of Tommaso Campanella has the idea of a society in which there is no private property, and not only on the land [3]. At the same time, most countries of the world have solved the issue of the ownership in favor of the private land, as well as buy and sell agricultural lands. State ownership of land exists only in a few countries, including Israel, where 91 % of the land fund belongs to the state.

Supporters of the private land ownership advocate its expediency because it is one of the driving forces of economic processes because of the action of the entrepreneurial resource of man. In our opinion, the most convincing example of this statement in Ukraine is the functioning of garden (cottage) areas, usually in the size of 0.05-0.07 ha. At the same time, the size of the lots is adequate to the level of technological weaponry of the owners, which determines their effectiveness. As the experience shows, the effect is much lower with a significant increase in the area of land and the same technological equipment. Nowadays, at the expanse of the private ownership people have made with their work created an oasis on hundreds of thousands of privatized lots, which are most often parceled on "unfavorable" lands. In the case of creating collective gardens on these lands, which would combine, for example, hundreds of garden lots, such an effect could not be achieved. At the same time, we agree on the fact that the coordinated work of the

group of people is more productive given the high level of their consciousness and self-organization, which is proved by an example of Kibbutz in Israel.

Among the reforms implemented in the domestic agricultural complex, land is the most complex and responsible one. This is due to its profound social significance and methodological and technological peculiarities of implementation which does not allow errors that are much more difficult to eliminate than reform, such as pricing, taxation, lending, customs tariffs, quotas, etc.

Unfortunately, private ownership of land in Ukraine has not yet provided the desired economic effect. Currently, the production of agricultural products at comparable prices in 2010 per unit area didn't reach the level of 1990 in 2015. To a large extent this is due to the lack of proper economic environment and material and technical equipment of owners in accordance with the size of allocated land shares. An effective owner should provide performance that would significantly exceed the size of the rent, which in 2016 was 10.3% in the structure of production costs. This is the essence of the economic transfer of land to an effective tenant, or owner.

In order to provide the extremely necessary investments into agriculture due to layland, which will allow to increase the efficiency of the industry by two-three times, it is predicted to introduce land buying and selling. Consequently, supporters of the immediate introduction of the land market sees it as the main lever of agricultural development, and the obstacle on this path is the lack of necessary legislative acts. By sharing this concern, we believe that this is a very important, but not a major obstacle to the land market.

It is necessary not only to adopt the necessary laws, but also to implement them, to create an appropriate moral environment in the village, to teach people to use these legislative acts knowingly, especially in the context of existing corruption and the fact that among the tenants about 60 % are pensioners. Without taking onto consideration these features, we expect very big difficulties. The term of calling off of moratorium is repeatedly postponed. Today, it is again delayed. Land inventory is not yet completed, land for its owners is not allocated everywhere in kind, there are no substantiated forecasts regarding the price level for agricultural land when the moratorium is called off , it is not determined what quantity of land will be offered for sale, etc. Thus, there is a paradoxical situation in the country, when the moratorium on land buying and selling did not eliminate the corruption schemes of underground facilities, and at the same time, it was not prepared for the moral and economic environment for the introduction of a free market. Independently, neither a moratorium on land nor a free market will not fulfill this function. In Ukraine, first of all, it is necessary to eliminate corruption,

reform the judicial system, to ensure a transparent process of land movement from less efficient landowners and land users to more efficient.

Thus, it is not entirely correct to ask – are you for the land market or against? Introduction of the market is not an end in itself. The consequences of introducing the land market should be predicted. If they are positive - then "for" the market, if negative - then "against" the land market.

Society and villagers are primarily concerned about the consequences of calling off the moratorium on land buying and selling. Will lay land become a powerful source for attracting much-needed funds into agrarian production? Will millions of tenant villagers profit economically from the full-scale functioning of the land market?

The answer to these and other issues related to this problem should be given even before the moratorium is called off, in order to prevent the negative consequences that accompany the under-weighed reforms in the economy of the country and especially in its agricultural sector.

The topical issue among all others is – what will be the land price after calling off the moratorium? Without knowing what could be expected in the near future, it is impossible to give a fairly reliable answer to any of the questions raised. In this regard, care should be taken to call off the moratorium, without predicting its consequences, and, above all, the price at which the buying and selling of land will be carried out and how much land will be offered for sale. Without clarifying these questions, it is not appropriate to do this.

We suggest the following approaches to determining the price of agricultural land.

The first option involves the use of questionnaires. Ukraine should conduct a thorough investigation to determine the estimated impact of calling off the moratorium on land sales. Thus, under the guidance of O. Shpychak thirteen years ago (in 2004 before the anticipated calling off of the moratorium in 2005) scientists of the Department of Economics and Land Relations of the UAAS (with the participation of O. Stratilata, N. Bunyak and others) developed a technique of forecasting the land price and its movement in case of cancellation of the ban on the sale of land parcels, which included a questionnaire and a memo to fill. The objects of the survey were determined by three village councils in each region of Ukraine and in the Autonomous Republic of Crimea. Village councils were chosen according to the level of land usage in the region: better, medium, worse. The total number of respondents was 55 – 60 thousand owners of land shares. The key to success was that nearly 100 employees from 25 regional research institutes of the National Academy of Sciences of Ukraine, who had family ties or worked on the territory of the respective village council, were involved in the

survey, which ensured the trust of the respondents and ensured the objectivity of the data received. The questionnaire was anonymous, but signed by the person who conducted the survey. A seminar was held with the employees designated for the questionnaire, forms of questionnaires and memorandum were submitted for their completion.

Among the 27 questions of the questionnaire were questions, whether the owner plans to sell or buy land, how much and at what price? As a result, about 12 thousand questionnaires were collected. An extremely important and compulsory point was that the questionnaire was carried out by people who had the trust of the respondents in land as a unique mean of production, which is essential for the collection of objective information, since the land issue is especially important for villagers. As a result of the survey conducted in seven regions of Ukraine at that time, there were only 3 % of respondents who were ready to buy a land parcel, while the share of willing to sell it was 14%. That is, the difference between the probable supply and demand for land was about 4.7 times.

The gathered information in questionnaires provided an automated processing. The costs of the questionnaire were calculated, and it was necessary to allocate only 200 thousand UAH. However, these funds were not allocated and the work was suspended, and for more than ten years only discussions have been ongoing.

It should be noted that in the United States for the service of market news every year it is allocate from the budget about 21 million dollars. And we continue to admire the fact that the US effectively manages the agribusiness, knowing that the one who owns the information owns the world.

The absence of minimal funding in our country for the gathering and processing of this information concerning the fateful problem leads to the conclusion that the conclusions are made without proper justification.

In different periods of time, unsystematic surveys were conducted in the form of surveys on the land market. So, for example, according to the Association of Ukrainian Agribusiness Club the poll in 2010 showed that among 460 heads of large and small agricultural enterprises in 22 regions of Ukraine 50% of respondents were against the market of agricultural lands, 12% – for entering it in 2012-2013, 30% – for entering the market in 3-10 years, 3% – not determined. In 2017 in the framework of Agrinvest Forum there was conducted a survey of 420 agricultural producers (with a land bank of 2.7 million UAH) on the necessity and consequences of the opening of the land market. Among the respondents, 48.4% expressed their support for the gradual opening of the land market, starting with the lands of state and communal property, and for calling off of the moratorium after 2021 19.6 %. When asked if your company has a means to purchase land, only 20.4 % responded positively.

There is no official data on the price level of land, and the existing single items in publications and speeches vary widely - from a dozen bottles of vodka per share to 10 thousand dollars US for 0.01 ha in the suburban area. In the media from time to time there is unsystematized information that the cost of 1ha of agricultural land in Ukraine will be at most 15 thousand UAH (H. Novak), and T. Gagalyuk claims that it will cost no more than 5 thousand UAH per 1 ha. According to O. Nivievskyi the price for 1 ha of agricultural land in the Transcarpathian region amounted to 1,500 UAH, and in Kirovograd – 5500 UAH.

For the sake of fairness, it should be noted that the establishment of land prices by questionnaires has a certain disadvantage. As a result of the survey, the seller is naturally inclined to overestimate the sale price, and the buyer is accordingly underestimated.

However, we can not agree with the opinion of some experts that we will determine the price of land already on the fact of its buying and selling. Note that in the world practice, even the traditional markets for agricultural products and food (wheat, sugar, milk, meat, etc.) are expected to annually to carry out analytical work and to determine the forecast price level. Then why do we refuse to forecast the prices on such important and unique product as land? After all, unlike agricultural land, traditional and agricultural products in next season will renew, in which case the price situation is automatically coordinated. In the case of land sales, errors can not be allowed because they can cause social disturbance. However, it does not at all say that it is not necessary to forsee the prices for land, and that this work should be carried out extremely carefully and in several methods.

The land is a special product, and in the macro-economic aspect it has an absolute inelastic proposition. The land is absolutely limited, and society can neither short- nor long-term offer more land than it exists at all. There is a famous Mark Twain's saying: "Buy land – nobody produces it anymore". Land prices are constantly rising. So, in the US the price of 1 ha of agricultural land tripled in 2016 compared to 1999.

The problem of the land market must definitely be considered through the prism of the land price, without which the market cannot exist at all. In addition to determining the price by means of a questionnaire, we will also consider two options for predicting land prices before calling off the moratorium on land sales.

The secondoption. The methodical approach for determining the price of land, which is based on the theoretical principle of a direct link between an existing rents and the price of land. In world practice, the land price is determined by the capitalization of the rent by dividing its value by the discount rate. The level of the latter in the developed countries of the world varies within 3-5 % and depends on the interest rate on the use of capital.

It should be noted that there is a way of determining the price of land through the capitalization of conditional net income per hectare of agricultural land. Our research has found that the usage of such an approach in the present conditions of Ukraine is not without certain methodological difficulties. Therefore, the methodological principle of the formation of land prices through the capitalization of the value of rent remains more acceptable.

It is expedient to capitalize the rent on the interest rate (coefficient) for saving cash on the deposit account. A rational landlord agrees on the amount of annual rent, the lower limit of which is equivalent to interest income from saving cash on a deposit account in a bank in an amount equal to the price of 1 ha of land leased out. The connection of these quantities was spoken by W. Petty in the paper "Economic and Statistical Work" in 1664 [4].

Taking into account the above formula, the calculation of land prices for this methodical approach is the following:

$$P_3^{(x)} = Rp : Ird \text{ (1)}$$

Where Rp – rent price; Ird – interest rate on deposits, coefficient [5].

The advantage of the proposed approach is the availability of information and simplicity of calculation. Based on the above theoretical and methodological approach, we will calculate the price of agricultural land, assuming that it is already allowed to buy and sell this resource. Yes, in 2015 1 ha arable farms Ukraine got in 1176 UAH of rent price (Table 1). So, the price of 1 ha of arable land due to the capitalization of rent deposit rate at 15% annual (1176: 15x100) will be 7843 UAH or 280 dollars USA. It should be noted that in the regions this indicator has a rather large variation. Thus, in 2015 the minimum estimated price level of 1ha of arable land was 5,018 UAH in Zakarpattya and 5044.4 UAH – in Volyn, maximum – 14769,2 UAH – in Cherkasy and 12033 UAH – in Poltava regions.

As we can see, the land price is low, and without significant increase in the efficiency of agricultural production, its level cannot objectively rise.

Table 1 **Calculation of the price of1 ha ofarable land in regions of Ukraine in 2015**

Administrative and territorial units	arable land total, thousand ha	Out of them leased, thousand ha	The share of leased arable land in its total amount, %	Rent price 1 ha of arable land, UAH	The share of rent price in the production costs, %	Price 1 ha of arable land (through capitalization of rent price), UAH
Ukraine	16166.1	15507,2	95.9	1176.5	8.8	78 43.2
Vinnytsa	903.6	880.0	97.4	1452.1	7.6	9680.9
Volyn	182.4	173.1	94.9	756.7	3.2	5044.4
Dnipropetrovsk	1081.1	1033.4	95.6	1030.5	8.2	6870.2
Donetsk	674.7	660.6	97.9	796.5	8.4	5309.7
Zhytomyr	432.8	408.9	94.5	840.0	7.0	5599.8
Transcarpathian	16.2	3.6	84.0	752.7	2.0	5018.0
Zaporizhia	977.3	932.0	95.4	944.1	11.6	6294.0
Ivano-Frankivsk	132.5	131.4	99.2	918.5	4.3	6123.5
Kyivska	940.9	908.8	96.6	1667.7	7.6	11118.1
Kirovograd	980.4	931.2	95.0	1195.2	12.2	7967.7
Lugansk	539.7	529.3	98.1	803.7	13.3	5358.1
Lviv	235.2	229.2	97.4	1128.8	5.6	7525.1
Mykolaiv	828.3	784.8	94.7	985.6	9.8	6570.7
Odessa	1142.6	1100.5	96.3	802.3	9.7	5348,9
Poltava	1155.9	1130.7	97.8	1804.9	12.0	12033.0
Rivne	228.3	213.6	93.6	1112.4	6.7	7416.2
Sumy	779.2	757.0	97.2	1018.6	8.9	6790.4
Ternopil	440.1	439.3	99.8	1125.3	7.4	7502,2
Kharkiv	1062.8	985.1	92.7	1116.0	9.6	7440.0
Kherson	733.8	691.4	94.2	794.9	9.0	5299.0
Khmelnitsky	704.1	693.5	98.5	1422.5	10.0	9483.2
Cherkassy	772.5	739.9	95.8	2215.4	9.8	14769,2
Chernivtsi	105.8	102.2	96.6	1170.9	8.0	7805.7
Chernihiv	906.8	882.2	97.3	952.6	7.5	6350.8

Source: According to the statistical bulletin "Basic economic indicators of production of agricultural products in agricultural enterprises for 2015".

In order to satisfy the credibility of the proposed approach, we have calculated the price of land in the US through the capitalization of their rent and a comparison of the estimated and current (factual) price of land in the United States (Table. 2). Deviations from these prices were detected in 2010 and 2014 within the acceptable level (2.4–18%). It should be emphasized that the first attempt of methodical study determining the price of land were made by W. Petty, according to him the cost of land equals to 18-21-year rent.

Table 2 **Pricing of 1 ha of arable land in Ukraine and the US**

Indicator	2010	2015
Ukraine		
Deposit rate %	15	
Rent price, UAH	316	1176
Land price, UAH	2107	7843
Indicator	2007	2013
USA		
Deposit rate%	5	
Rents, US. USA	192	415
Estimated price of land, USD. USA	6400	8300
Factual price of land, USD. USA	6253	10130
Deviations of the factual settlement price %	2.4	18.0

An extremely important factor in the formation of the low price of land in Ukraine is too high interest rates on credit which for agriculture is 26 % and the rate for the money on deposit for a period of 1 year or more – 15-17 %, which makes the high price of land in our country impossible.

Third option. Calculation of the price land forecast based on the purchasing ability of the population.

We have made an assessment of opportunities to purchase 1 ha of land on the basis of wages in Ukraine and, accordingly, in the developed world, where the land market is functioning.

This methodical approach involves determining the number of months salary in advanced countries which are needed to purchase 1 ha of land in the native country and then move the number of months in terms of Ukraine (for real this salary) and define thus the predictable the price for 1 ha of land. As the example in France, it will be 576.2 dollars. USD, or 13 times less than in France. In addition, we determined the number of months that a Ukrainian should work to buy 1 ha of land for the price of France – 38.8 months, or almost 14 times higher (Table 3).

Table 3 **Indicative pricing of land in Ukraine due to land value and salary**

Country	Salary, USD. USA	Land prices in USD USA for 1 ha	First sale of land	Number of months necessary to work to buy 1 ha of land
Germany	3492	11600.6	2013	3.3
France	2682	7453.0	2012	2.8
Czech Republic	1262	3137.2	2009	2.5
USA	4400	10130.0	2013	2.3
Ukraine	192	576.2	2015	3
Ukraine compared to France %	7.1	7.7	x	x
The number of months required to purchase Ukrainian 1 ha of land in his factual salary and the factual price of land in France (accordingly for a Frenchman to buy land in Ukraine 14 times less)				38.8

An important factor that determines the low price of Ukrainian land is a weak competitive environment in the land market by Ukrainian buyers who directly live on their land due to their extremely low purchasing ability. It is well known that the rural population does not have free cash as salary among the lowest in material production country and even falls far short of the average salary in Ukraine. Thus, most of the villagers of working age not in a position today to buy land and expand their production [5, 6].

With such low prices on the land market may receive a significant portion of the wrong buyers who purchase it not for further use in agriculture but for profitable savings with a firm conviction that the land in the future will certainly be valued highly. This method is forced by the country due to high inflation and exchange rate instability.

When calling off the moratorium on land sales must conceptually define what we want eventually.

We have considered the following options.
1. If strategically anticipate the development of farming in the Ukraine, which, in our opinion, is the most reasonable option, you should take a position on the purchase of agricultural land by persons of Ukrainian nationality who live or operate within the territorial unit where the land area. In this case the owner of the land is fully interested to participate in improving the welfare of the

local community, rural development, environmental security, solving social problems of the people who live there and so on.

2. However, the downside is that under current conditions of Ukraine the low solvency of potential buyers within the local community the land price, unfortunately, will be low. The result will not have a desirable investment growth.

3. Subject to the right to purchase agricultural land to persons of Ukrainian nationality who do not necessarily reside within the local community may be threatened by the development of farming. However, there could be the rise of the number of paying customers compared to the first version of a land price, the amount of funds in agriculture in Ukraine. There is also the danger that the owner could care less about environmental and social problems of the territory where the land is located.

4. Subject to the right to purchase agricultural land to people with foreign citizenship, land prices in Ukraine most move toward the world level compared to previous versions. In this case, you can expect a substantial increase of investment in agriculture, introduction of innovative technologies of the best world level, significant growth rates of production of certain products, the most profitable in the world market. However, under these conditions, there is a high threat of loss of statehood of Ukraine and its transformation into a raw material appendage of the world market, etc. [6].

Today on the land market there is a practice contract to use the land for 49 years and pay rent in advance. With average rents in 2015 1176 UAH this amount will make 57624 UAH or 2216 US dollars. Certainly for farmers in today's environment, this amount is greatly appreciated. However, analysis of the dynamics of land prices in the world in retrospect shows that there are significant growth of land prices. Particularly in France during 29 year period (1985-2014 years) the price of arable land increased from 3263 to 5940 euros per 1 ha , or 1.8 times. In Poland for 24 years (1990-2014) the increase was from 224 to 7723 euros per 1 ha or 34 times. Accordingly, there have been growing rents for the land. So, no doubt that for the tenant a subject of paying the rent in advance in the amount fixed as the contract is attractive, but we believe that the land owner in this case are significant losses.

It should be noted that the entry of Ukraine on the land market should not be an end in itself. The aim should be benefits that farmers and the state receive as a result of its functioning. Today it is necessary to define the conditions under which the introduction of the land market will give the desired result.

Ukraine, as most former Soviet republics, held deep transformation of the existence of a free land market in times of Stolypin's reforms to state ownership of

land in the former Soviet Union. Today Ukraine is again before the opening stage of the land market. It should be noted that such transformations were accompanied not only by economic but also significant changes in the psychology of farmers.

Particular attention should be payed to the experience of Ukraine of early twenties about the functioning of land markets and providing loans for its purchase, availability of appropriate land banks. It should be noted that the purchase of Ukrainian lands happened because Peasant Land and state banks. In 1901-1911. Purchase price of 1 ha of land in the provinces ranged from 150 rubles (Tavria) to 246 rubles (Poltava). In particular, the Kiev province 1 ha of land could be bought for 210 rubles, which was adequately a value of 3 tons of wheat, or equal equestrian payment working for 5 months. In addition, the ground could lay in the bank for a loan (Table 4). This was done by the noble state land bank, Peasants' Land Bank and private banks. The amount of land planted bail in 1912 was 55-80 % of the total private land ownership. Moreover, the mortgage amount was 60 % of the assessment laid down the ground. Assessment of land planted as of 01.01.1912. in provinces ranged from 161 rubles (Bessarabia) to 62 rubles (Volyn). Note that among the mortgage there dominated the land that was remortgaged and that was potentially dangerous, since shows a danger of losing their own land. Thus, in 1910 in all mortgaged lands the amount of remortgaged was 63-94 %. It should be noted that the assessment of 1 ha of land received as a bail for 20 years increased by 2-3 times. In addition, the Peasants' Land Bank provided a loan for the purchase of land. The largest number of loans allocated to households (80-90 %), but compared to their volume of loans to companies, was much greater, resulting in the amount of land bought in recent amounted to 60-80 % of the total land sales [7].

Based on the obtained results of the study we can conclude that without a substantial progress in improving the efficiency of agricultural production price of 1 ha of arable land in Ukraine is quite low.

For the low price of land dubious inclusion into the resource market economy in order to obtain significant working capital through the land as collateral. This is due to certain reasons. First, the bank may give bail amount of money within only 50-60 % of the value of the mortgage. Secondly, the farm leased land is 97 %, and its pledging is problematic. A widespread view on the use as a mortgage the lease rights, but that as the functioning of the State Land Bank requires extensive research. The experience of Poland, Czech Republic, Slovakia and other countries where security of land is not common.

Our predictions for low market prices for Ukrainian land are shocking. However, this risk is less than euphoric expectations of Ukrainian land prices at the

level of advanced countries. With the high prices we will overcome easy, but with the low prices it will be problematic.

Extension of the moratorium on sale of agricultural land, in our opinion, gives Ukraine another chance to implement at national level these essential steps:

- through economic instruments of macro level to create favorable economic environment for the development of agricultural production where the farms will be able to significantly improve the efficiency of production;
- introduce a program of long-term concessional lending able-bodied farmers who intend to buy land to create its agricultural business or expand existing in their agricultural production;
- after calling off the moratorium on land sale it must be established a minimum price for it below which agreements of sale of this resource could be recognized invalid;
- now it is not necessary to allow foreigners at the domestic land market, although this may increase the actual price of 1 ha of agricultural land to 7000 dollars. USA. In particular, the Chinese authorities have included in their time accumulating 60 billion USD for the purchase of Ukrainian black soil in case of cancellation of the moratorium on sale of agricultural land;
- to prevent land speculation should set a deadline within which be prohibited the resale of purchased property in land and in violation of this term to define the extremely high taxes on profits from the difference between the sale price of the land and its purchase;
- systematically explore the land movement on the market and the expected level of prices, using the proposed approaches to predict movement of land and its price.

This should provide the appropriate means and in any case not to skimp on this issue.

Table 4 Number of individual land in private ownership, private ownership debt in January 19121, the value of 1 ha of land mortgaged and the amount of loans (the provinces of Ukraine)

Provinces and region	The total amount of land, thous. ha	Number of individual land in private ownership, thousand. ha	The proportion of land private to all personal property, %	amount of land mortgaged bail thousand. ha	Relation of mortgaged land to total private land ownership, %	Assessment of land mortgaged, million rubles	Amount granted loans - primary and secondary, million rubles	Remaining debt on January 1, 1912, million rubles	Value of 1 ha mortgaged land, rubles	The size of loans of 1 ha of mortgaged land, rubles
Bessarabska	4191.5	1810.1	43.2	1374.6	76	201.5	122.6	113.6	147	89
Herson	7039.6	3741.0	53.1	3050.2	82	375.7	214.7	195.4	123	70
Tavria	5748.1	3023.2	52.3	1657.3	55	165.8	96.2	86.8	100	58
Yekaterynoslavs'k	6089.1	884.4	14.5	2265.3	74	240.4	146.6	136,4	106	65
Kiev	5053.6	2287.1	45.3	1591.3	70	200.5	127.8	121.6	126	81
Podolsky	3997.2	1777.0	44.5	1427.5	80	207.6	132.1	125.5	146	92
Volyn	6308.9	3082.2	48.8	2314.5	75	152.2	94.6	90.9	66	41
Kharkov	4915.5	1757.9	35.8	1254.2	71	169.0	112.6	107.7	135	90
Poltava	4645.5	2189.4	47.1	1435.6	66	204.5	134.6	127.6	143	94
Chernihiv	4792.0	1995.4	41.6	955.4	48	79.0	54.5	51.7	82	57

4   Conclusions

The issue of land pricing is complex and multifaceted, its solution requires functioning a transparent land market. It is proved that establishing an appropriate pricing system which takes into account the economic and political situation, inflation level, social policy, competition level in the land market, in the development of the land market in Ukraine is an important part of the state regulation of land pricing. This will ensure a competitive environment on the land market, stimulating land rational use and protection, satisfying public interests, objectivity and legality of the assessment, introducing into practice the assessment of international norms and rules, increasing revenues to the state budget, legality of the land dealing market.

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COMPARISON OF CHANGES IN SECTORAL STRUCTURE OF FIRMS IN THE CZECH REPUBLIC AND IN THE SLOVAK REPUBLIC

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Abstract

The aim of the paper is to analyse and compare changes in the sectoral structure of firms in the Czech Republic and the Slovak Republic in the period 2010-2016. The sectoral structure of firms is one of the important determinants of employment not only at the level of the country but also at the regional level. In the past, it was typical for both countries „regional specialization". In practice, this meant that the regions were often associated with a dominant firm that influenced the life of the whole region (for example Košice - VŠŽ, Šaľa - Duslo, Kopřivnice - Tatra, Hlinsko - ETA etc.). Such a mono-structural economic basis for the regions has brought higher labor productivity and associated less costs, but on the other hand, the region has been economically unstable. Economic changes in both countries over the past 25 years have brought major changes for the economy. From the centrally planned economy, both countries moved to the market economy, which to bringing them also major changes within the sectoral structure of firms. The transition was characterized, in particular, by the downturn in agricultural production and the transition from the heavy and armament industry to the processing industry. Further changes in the sectoral structure have taken place at the time of the enlargement of the European Union of the new member countries and the associated globalization of the economy. Based on the economic classification of CZ - NACE and SK - NACE, we evaluated the number of firms in selected sectors in both countries. The orientation of the Slovak economy in the last period especially on the automotive industry and the related activities caused to the fastest increase of the number of firms and the number of employees in this industry. Increase of employment in industry has also brought

increase of employment in services, particularly in accommodation and catering. Similarly, in the Czech Republic, we are seeing an increase of firms in industry and services, but it is interesting that despite the decreasing number of employees in agriculture, the number of firms in this sector has increased.

Keywords: *agriculture, industry, sectoral structure of firms, services*

JEL classification: *O11, A11, J21*

1   Introduction

Korec (2009) notes that in the period of social transformation, has occurred in the countries of Central and Eastern Europe changes in the sectoral structure of the economy. Changes in the structure of the economy by three of its basis sectors are well visible not only at the state level but also at the level of its individual regions. It also confirms Zygmunt (2018) who say that the effects of the transition of the economy depends on business activity in the country. The entrepreneurial activity is considered as one of determinants of economic development in market economies. One of the important factors that determine business activity in the space is their competitiveness. Hamplová (2012) notes that competitiveness is strongly influenced by the conditions in which businesses of varying sizes at national and international level are operating. In particular, they are affected by the laws that determine their activities, limiting their activities or encourage the founding of new businesses and also create space for international trade. Rusnák and Lehocký (2016) are considered the basis for the condition of localization of the firms in the space is the factor of transport costs between inputs and outputs. These assumptions have evolved into a theory of agglomeration advantages in neoclassical economics where the concentration of economic activities is explained by a combination of three elementary factors: sufficient skilled labour   network of specialized companies and a common infrastructure and knowledge. Piecuch and Niewiadomski (2016) think that an important development factor of localization is the financial support from the EU funds, because they say that the economic crisis, which in recent decades affected the Western world revealed the fact that the countries with low level of economic development, structural problems, bad situation of public finances and the labour market, without the help of EU would face on big problems. The next few years should answer the question whether the structural changes will bring those countries a dynamic economic growth.

2   Data and methodology

The aim of the paper is to analyse and compare changes in the sectoral structure of firms in the Czech Republic and the Slovak Republic from the point of view of regional employment in the period 2010-2016. We analyse the development of the number of firms in selected sectors at the level of the country, but also in individual regions. The basis for the analysis was the inclusion of firms according to classified CZ - NACE and SK - NACE into the category of agriculture, industry, accommodation and catering services. These firms represent the representation of all sectors of the national economy in the economy of both countries. The data for the analysis were obtained from publicly available databases Czech statistical office and Statistical office of the Slovak Republic. We used a method of mutual comparison and the results were processed in MS Excel in the form of graphical outputs.

3   Results and discussion

Within the analysed period, the total number of firms in both countries did not change significantly. In the Czech Republic, with the exception of the year 2013, we recorded an increasing trend of firms every year. A similar trend is also observed in the Slovak Republic, but there was a slight decrease of the number of firms recorded in 2015. Konyova and Bartova (2015) note that generally, the Western part of the Slovak Republic, including Bratislava (capital) region has always been more economically developed. They found, that the Slovak economy was more specialized before the Slovak Republic accession to the EU. After the accession, there has been a diversification of the economic base and the most diversified was Bratislava region. The most specialized was the Western Slovakia economy. Industry concentration had been declining significantly in the Western Slovakia, while growing in the Middle and stagnating in the Eastern, less developed part of the country and in Bratislava region.

In terms of sectoral structure in both countries, industrial firms represent the biggest share of the national economy (Czech Republic - 11.76%, Slovak Republic - 9.11%). The biggest transformation has passed the agriculture firms in both countries. Nevertheless, their number, with the exception of 2013 in the Czech Republic and except in 2018 in the Slovak Republic, has increased annually (picture 1). But Kalusová and Badura (2016) they found out that there were significant differences in the structure of funding sources of Czech and Slovak agricultural enterprises. Slovak agricultural enterprises are struggling with a high indebtedness and an inappropriate structure of external funding sources (a decisive share

of liabilities consists of short term funds, while the share of long-term external funds is minimal). Such high level of indebtedness, in conjunction with the low share of long-term financial sources, requires more attention to ensuring the solvency of those Slovak firms. Another situation is in the service sector. While in the Czech Republic we are seeing a slight decrease of the number of these firms in 2013, the number of such firms in the Slovak Republic has increased annually. Agriculture has a significant share on creation of the rural economy, which is being created outside the huge cities and keeps forming the primary economy which produces the material goods consistently connected with industry and business (Rovný, Nagyová, 2007).

Picture 1 **Development of the total number of firms and number of firms in selected sectors in the Czech Republic and Slovak Republic in the period 2010-2016**
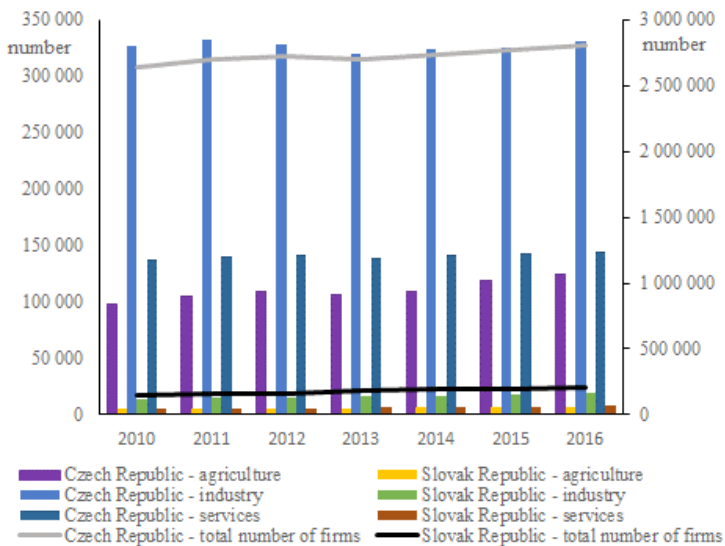
Source: Czech statistical office and Statistical office of the Slovak Republic, own processing.

In the context of the Czech economy in the year 2013 present a continuing recession. In 2012 the final expenditure of consumption and also investment activities caused the decline of GDP, in the 2013 there was a slight increase of final consumption expenditure, but the investment activities dropped. The fall in GDP also affected foreign trade in both years. It had a positive effect on GDP in 2012

but in 2013, contributed to its decline by a year-on-year deterioration of the import and export balance.

Picture 2 **Development of the total number of firms in the Czech Republic and individual regions in the period 2010-2016**

Source: Czech statistical office, own processing.

Within the regional localization of firms in the Czech Republic their biggest representation are in the region of Prague, the Capital City. On the contrary, the smallest number of firms are established in the Karlovarský region. This low number of firms is mainly determined by the relatively small size of the region (the size of region is represent 4.6% of total size of the Czech Republic). Compared to 2010 and 2016, we record the growth of the total number of firms, with the exception of Plzeňský, Karlovarský, Ústecký and Liberecký regions (picture 2).

Picture 3 **Development of the total number of firms of agriculture in the Czech Republic and individual regions in the period 2010-2016**
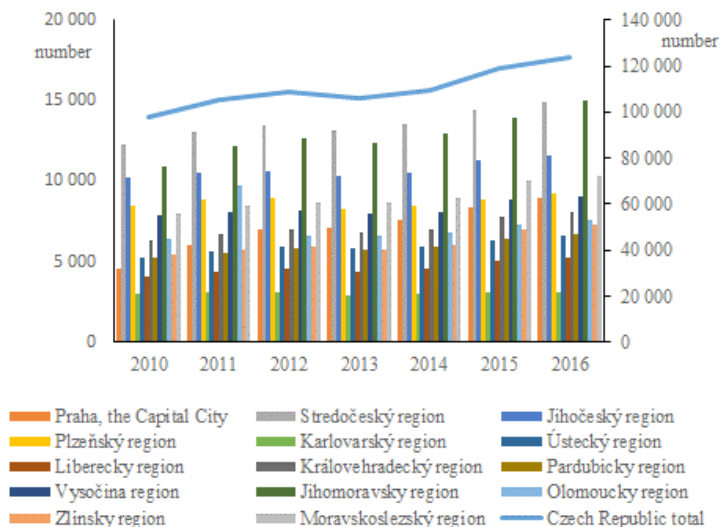
Source: Czech statistical office, own processing.

As for agricultural primary production, we record, with the exception of 2013, an annually increase in the number of these firms in the Czech Republic. The highest number of agriculture firms are established in Stredočeský, Jihočeský and Jihomoravský region (picture 3). These status of these regions are historically based on more favourable soil-climatic conditions. Blas (2008) note that after the Czech and Slovak Republic have joined the European Union on 1st May 2004, both countries have adopted the Common Agricultural Policy, as well. Despite the operation of the Common Agricultural Policy and the impression of creating a uniform economy, there are some researches proving that there is a considerable variance among the productivity, the technological level as well as the market integration of agricultural enterprises in different EU countries.

Within industrial production in 2012 and 2013 there was a decrease of the number of these firms in the Czech Republic (the decrease in 2012 compared to 2011 was -1.11% and the decrease in 2012 compared to 2013 was -2.87%). In the next years, we are seeing an increase of the number of these firms. The biggest number of these firms outside Prague, the Capital City, was in Stredočeský, Jihomoravský and Moravskoslezský region (picture 4). These regions belong to regions with significant economic potential (the biggest employer in the Stredočeský

region was ŠKODA AUTO a.s. in Mladá Boleslav). Compared to 2010 and 2016, the number of industrial firms increased in Czech Republic by 1.07%.

Picture 4 **Development of the total number of firms of industry in the Czech Republic and individual regions in the period 2010-2016**
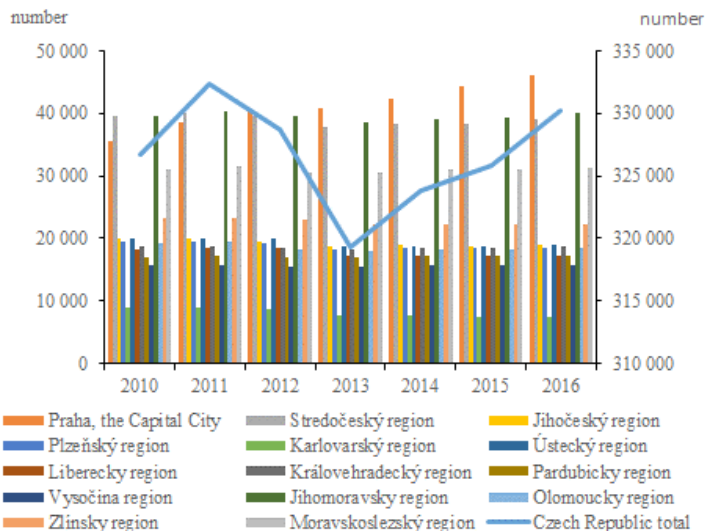
Source: Czech statistical office, own processing.

The development of services is closely determined not only by the economic development of the country but also by the population density of the area. In the Czech Republic, the number of services, with the exception of 2013, grew annually during the analysed period and in comparison with 2010 and 2016 this increase was 6.06% (picture 5).

Picture 5 **Development of the total number of firms of services in the Czech Republic and individual regions in the period 2010-2016**
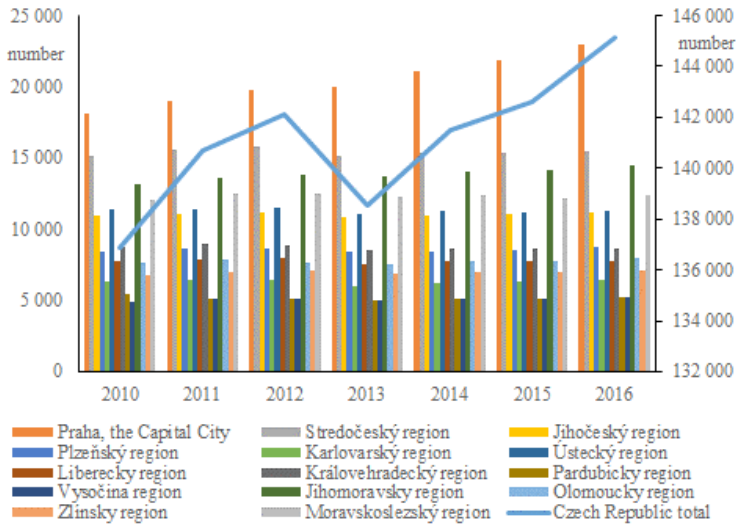
Source: Czech statistical office, own processing.

This trend is also confirmed by the Czech Statistical Office, according to which the number of nights spent in the collective accommodation establishments grew year-on-year by 8,5% in the 4th quarter of 2016, growth represented 8,7% of the domestic visitors and 8,3% of the foreign visitors. In the regional aspect, growth was reported by accommodation establishments in all regions. The highest proportion was attributed to operators from the Vysočina Region, where the number of nights increased by 19.6%. Further growth was achieved in accommodation establishments in Karlovarský, Olomoucký, Jihočeský and Pardubický region.

The competitiveness of Slovak enterprises are primarily determined by the environment in which they develop own activities. Changes in the business environment are also reflected in the number and structure of firms.

Picture 6 **Development of the total number of firms in the Slovak Republic and individual regions in the period 2010-2016**
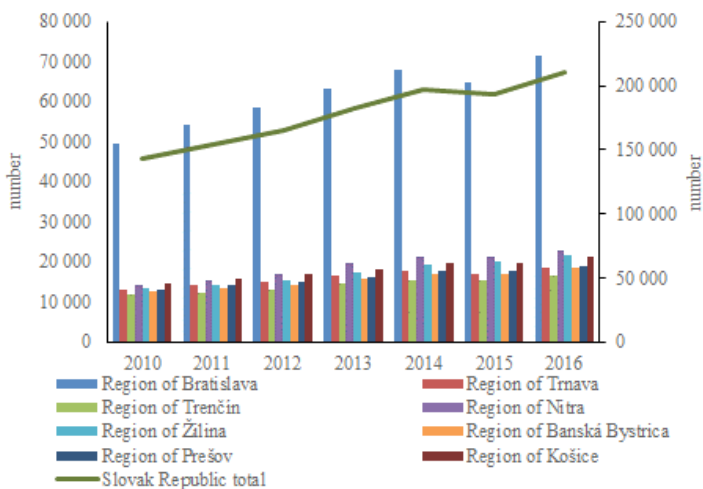
Source: Statistical office of the Slovak Republic, own processing.

Within the analysed period, the total number of firms in the Slovak Republic showed an increasing trend except for 2015. Compared to 2010 and 2014, the increase of the number of firms was 37.31%. In 2015, compared with 2014, the number of firms decreased by 1.57% (picture 6). The reason for a slight decrease of the number of firms in Slovak Republic this year could be, in spite of the rising GDP, mainly legislative changes related to the increase of the minimum wage, which increased to 380 € in 2015 (an increase of the minimum wage compared to the previous year was 7.95%). The raising of the minimum wage and with the associated increased employer´s costs can lead to many firms trying to reduce their wage´s costs, or firms that employ a minimum number of employees to lay off them and they to end own activities. In the end, however, the total number of firms in 2016 compared to 2010 recorded an increase of 47.39%. Within individual regions, most firms are localized in the Bratislava Region. This is confirmed by Korec (2009), who notes that in the region of Bratislava, practically all the factors influencing the development of the economy and general regional development accumulate in the extremely positive position (factor of the settlement structure highlighted by the status of the capital city, attractiveness supported by the big transport infrastructure, human potential and others). In the other regions of Slovakia we do not notice big differences of the number of firms. In almost all

regions, except of the regions (Region of Trenčín, Region of Žilina and Region of Košice), there are a slight decline of the number of firms in 2015. In the Region of Trenčín, Region of Žilina and Region of Košice, the number of firms increased annually.

According to the OECD, Slovakia includes rural areas, which means that most people live in the countryside. For rural areas, the typical activity is agricultural primary production. Since 1990, agricultural primary production has undergone significant changes in the conditions of Slovak Republic, which had big significant impact on the number of firms. Nevertheless, during the analysed period in Slovak Republic, the total number of firms in agriculture with the exception of 2015 increased annually. Compared to 2010 and 2016, we are seeing an increase of the number of firms in agriculture by 36.42%. The agricultural production depends mainly on the soil fund and the climatic conditions. But other authors (Ciaian, Qineti, Sojková, Kabát and Hanová, 2001) say that the important tool for agriculture farms is also agricultural policy. Despite the fact that the most fertile land in Slovak Republic is located on the Danube Lowland and on the East Slovak Lowland, the biggest number of agricultural firms has been localized in the Region of Banská Bystrica and in the Region of Prešov. In the framework of the number of agriculture firms in almost all regions except Region of Bratislava and Region of Žilina, we recorded a slight decline of the number of these firms in 2015 (picture 7).

Picture 7 **Development of the total number of firms of agriculture in the Slovak Republic and individual regions in the period 2010-2016**
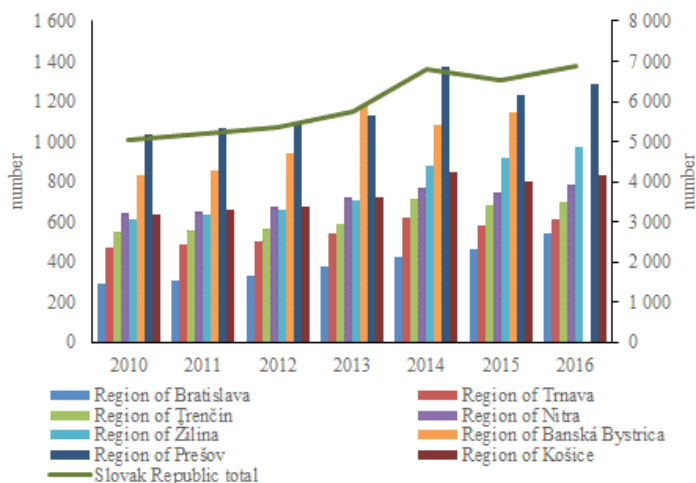
Source: Statistical office of the Slovak Republic, own processing.

Within the framework of industrial production, in recent years the Slovak Republic has become the leader of the automotive industry. At the moment, the Jaguar Land Rover, which will start its production in Nitra, will join to the automotive firms (Volkswagen, PSA Peugeot Citröen and Kia Motors) in 2019. This is also confirmed by the Ministry of Finance of the Slovak Republic (2016), which states that from sectoral point of view the value added in industry contributed to real GDP growth in 2015 (contribution to GDP growth was 1.7%) and the greatest position had the automotive industry. Establishment of these big automotive firms also required enlargement, respectively the creation of other business entities that have become subcontractors for these firms. In 2016, compared to 2010, we saw increasing by 34.45% of firms of industry. Despite the fact that the automotive firms are localized in Region of Trnava, Region of Bratislava and Region of Žilina, all regions except of Region of Trnava registered an annual increase of the number of firms of industry (picture 8).

Accommodation and catering services are among the basic services available to population in the regions. The development of these services are closely linked to the settlement structure and population abundance. When the higher number of the population living in the region, the offer of these services are wider. Gabrielová, (2002) notes that Slovak Republic achieves relatively high level of labour

productivity in the sector of services both in international comparison and also in the inter-branch comparison in Slovak Republic. Labour productivity in this sector increases alongside with the growth of employment. International comparison of more detailed structure of services' sector shows that in Slovak Republic are less developed just these services that are developing in modern economy very dynamically

Picture 8 **Development of the total number of firms of industry in the Slovak Republic and individual regions in the period 2010-2016**
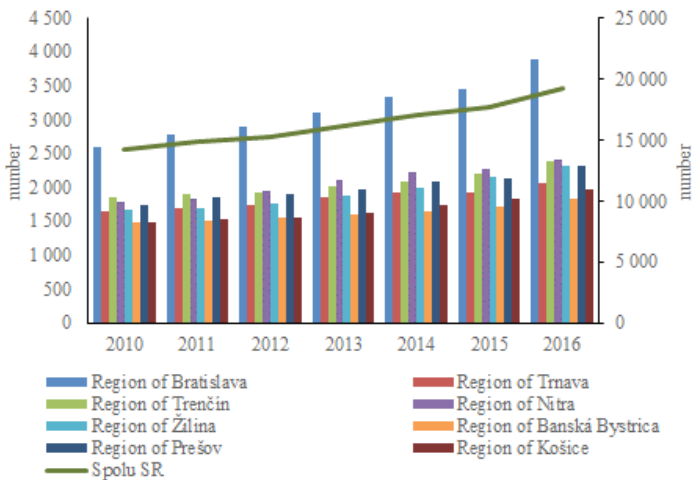
Source: Statistical office of the Slovak Republic, own processing.

The positive growth of the Slovak economy and the associated increase of wages, as well as tourism, contribute to the development of these services. In 2016 compared to 2010, the total number of firms of services grew by 54.97%. Within individual regions, it is possible to monitor the annual growth of the number of these firms with the exception of the Region of Prešov and Region of Trnava, where there was a slight decrease of the number of these firms in 2015.

Picture 9 **Development of the total number of firms of services in the Slovak Republic and individual regions in the period 2010-2016**
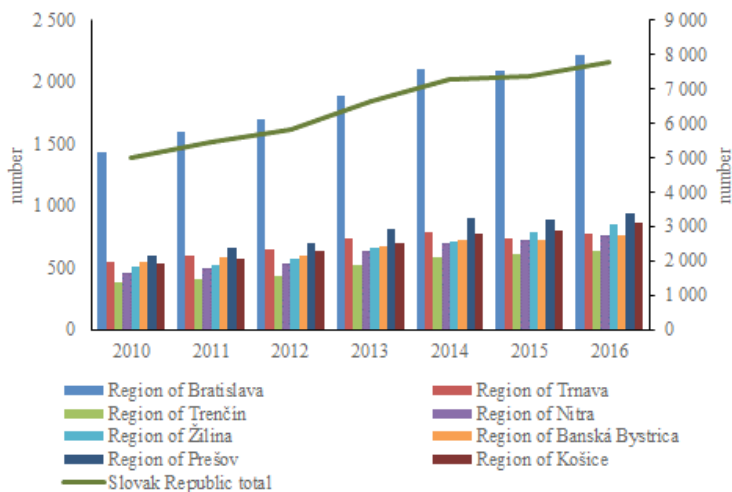
Source: Statistical office of the Slovak Republic, own processing.

4   Conclusion

The analysis of the sectoral structure of the Slovak Republic and the Czech Republic did not reveal significant differences in the representation of individual sectors in both countries. Despite the fact that the Czech Republic was in the past rather oriented to the processing industry, respectively for the finalization of products and the Slovak Republic mainly to the heavy industry, the arms industry and agriculture. Despite this, the Slovak Republic has become a leader in the automotive industry in recent years, and this industry has become the driving force of the Slovak economy. Dominant position of the industry is also in the Czech Republic, but compared to Slovak Republic, the Czech industry is more diversified. The orientation of the Slovak Republic to the automotive industry on the one hand brings the effects of specialization and the possibilities of innovation in this area, on the other hand, this narrow orientation may contribute to the economic instability of the region in the event of sharp changes in production. The possibility can be the development of key industrial development factors such as education, eco-efficiency and technological change in industry in Slovak Republic. The development of the number of agriculture farms is very positively. Despite

of the transformation process, their number increased in the period under review in both countries (with the exception of the recession period). The growth of the economy bring not only growth of GDP, but also an increase of the number of jobs and, consequently, an increase of wages that positively determines the development of services. In both countries there was an increase of the number of firms of services over the analysed period.

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AGRITOURISM AS A FORM OF SLOW TOURISM

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Abstract

The philosophy of slow tourism signs in agritourism. It is a form of tourism which is characterized by the connection of tourist services with an agricultural farm and the possibility of participating in the life of an agricultural family and farm. Agritourism has permanently settled in many European countries and in Poland has been developing with great success since the 90s. Agritourism as a form of slow tourism provides authentic and deep connections with the inhabitants, places, culture, food, heritage and the natural environment. It is a style of travelling which through the elimination of haste gives authentic contact with the environment and achieving inner peace.

The article has the character of a theoretical review. The method used in the work is literature and content analysis. The author is going to review the available publications and own research concerning slow tourism and its role in running an agritourism business. The aim of the article is to show the possibility of slow tourism development on tourism farms in Poland.

Keywords: *agritourism, slow tourism, rural area, sustainable development*

JEL classification: *J43, Q010, Z32, L83*

1   Introduction

Due to the strategy of a multifunctional development of the countryside and agriculture as well the European Union funds directly allocated to agriculture, rural areas are currently undergoing a number of significant socio-economic changes. One of them is the development of economic activity unrelated to farming (Sikora, 2014). An example of such activity is agritourism, developing in the rural

environment. It is a form of recreation which is present in almost all developed countries around the world. It takes on various forms, depending on the experience, natural conditions, the level of tourism development, etc.

1.1 Agritourism

Generally speaking, the main elements of agritourism include an active farm, involvement in farming activity, and the authenticity of tourists' experience of farming (Phillip & al., 2010). For many authors, the active farm is a key component (Jalinik, 2016; Drzewiecki, 2001, Majewski, 2000; Sikora, 1999), and providing tourism services is a complementary source of income for a farming family (Privitera, 2010).

In Europe, most agritourism facilities/sites can be found in Austria, Germany, Great Britain, France and Ireland (Marcinkiewicz, 2013). In Austria, about 10% of farms offer tourism services that can be used by over 300,000 people. In Italy, there are nearly 7,000 farms with the average of 10 places for guests each. A similar situation is observed in France and Germany (Firlej, 2006). Sikora writes that in West European countries, the average of 3-7% of farms provide agritourism services (Sikora, 2013). Przezbórska-Skrobiej (2015) reports that income from agritourism makes up ca. 15% of the whole EU tourism market. Agritourism activity provides at least one third of the total income of an average farm in the European Union (Firlej, 2006).

This non-agricultural activity increases the incomes of farms and serves farmers other purposes, such as improvement of their life quality (Tew & Barbieri, 2012). The benefits drawn from agritourism are numerous, not only for the farmer, but also for the local community. Agritourism strengthens the local economy, creates employment opportunities and new forms of employment and promotes educational and certification programs which teach young people about farming and natural environment (Privitera, 2010). Agritourism helps in preserving the rural lifestyle and landscape, as well as offers the possibility of practicing "sustainable" or "green" tourism (Uglis & Jęczmyk, 2015).

In the present age of globalization we may observe tendencies towards homogenizing tourists' preferences. Regardless of where they live, tourists expect standardized tourist products and prefer uniform procedures and standards of tourist services (Kachniewska & al., 2012). On the other hand, we can also observe preference polarization among tourists, who represent varied, individual preferences and consumption models. They want to experience something new, unique and prepared specially to satisfy their individual needs and preferences. Tired with the fast pace of living, constant haste and stress, they are looking for peace and quiet. During their journey and rest, they take more responsibility for

what they do and seek authentic experiences. Capable of reflection, they want to stop running for a while (Niezgoda & Markiewicz, 2014).

An idea developing in accordance with these tendencies is slow tourism which ideally fits the formula of resting on touristm farms. We can currently observe a growing interest in this conception among the societies of developed countries (Kacprzak & Gralak, 2015).

1.2 The idea of slow tourism

One of today's trends in the field of tourism is slow tourism (Yurtseven & Kaya, 2011), which derives from the slow food trend (Wiśniewska, 2012). The Slow Food Organization (www.slowfood.com) was established in 1986 in Rome as a manifesto against the "fastfoodization" of life (Burmecha-Olszowy, 2014). The movement was initiated by Carlo Petrini (a charismatic food critic) as a spontaneous reaction against the first fast food restaurant in Italy in 1985 (Sukiennik, 2014). Nowadays, it is an international non-profit organization associating 100,000 members in 160 countries around the world (www.slowfood.com; 18.01.2018). According to Lumsdon and McGrath (2011) slow tourism makes up 10% of the European tourism market and continues to grow.

The concept of slow which follows the idea of slow food (Yurtseven & Kaya, 2011) is becoming popular and concerns various areas of life such as eating and health (slow food), rest and recreation (slow tourism) or work and accommodation (slow life) (Kryk, 2011).

Slow tourism not only tries to fight against the growing pace of the contemporary life, but it goes further, combining qualitative experiences of the slow traveller with the pleasures derived from the journey and stay at travel destinations with the benefits for the local stakeholders (Conway & Timms, 2012). Dickinson and Lumsdon (2010) define slow tourism as a form of tourism where tourists avoid travelling by plane and car, take advantage of alternative forms of transportation, and choose longer stay instead of short trips, including contacts with the local community its culture and attractions. According to the definition they propose the main aim of this form of tourism is to shift the focus from the amount of travel towards its quality.

During their journey, slow tourists have contact with the local community, places, heritage, food and natural environment. In this form of tourism they devote their time to travelling, become involved in the visited places and meet the local inhabitants (Meng & Choi, 2016).

Slow tourists have been described by Yurtseven and Kaya (2011) as those who:
– are open to slow experiences, discover new and different cultures and identities,

- are educated, have good knowledge of culture and profess slow philosophy,
- are independent travellers,
- have high expectations from the region they are visiting,
- use eco-gastronomy.

A slow tourist stays at the visited destination longer and tries to get to know the area in much more detail, buys local products, putting their money into the local economy for a longer period of time (Hall, 2006).

The pillar of slow tourism is the philosophy of sustainable development, which encompasses environmental and socio-cultural sustainability (Matos, 2004). In practice, this issue combines elements of sustainable tourism (the economic, ecological and social aspects) and responsible tourism (Burmecha-Olszowy, 2014). This form of travel is to provide tourists with rich experience and minimize the negative influence of tourism on the environment (Kacprzak & Gralak, 2015).

Slow tourism favours rural areas (Matos 2004) where the pace of life is slower and people can practice various slow activities as well as derive pleasure from staying in the countryside (Guiver & McGrath, 2016; Lumsdon & McGrath, 2011). Rural environment can be an area where slow tourism will develop. It is predestined to restore the balance between people and nature, as a result of which a post-industrial society rediscovers natural environment (Zago, 2011).

2   Data and Methods

The aim of the article is to make the issue of agritourism as a form of slow tourism less ambiguous. The author describes and analyses the activity in question and shows how it can be integrated into the idea of slow tourism. The article is a theoretical review. In order to achieve the research aim, the author chose the method of literature analysis and used selected scientific books and papers published in scientific journals, regarding identical or related issues. She also used secondary sources of information and applied the descriptive method in the analysis of the research problem.

3   Results and Discussion

In Poland, the fashion for agritourism holidays appeared later than in Western Europe. Agritourism is one of the most important spheres of tourism activity in rural areas which developed in Poland in the early 1990s, using farms as the accommodation infrastructure (Firlej, 2002). Rural tourism in Poland has a long

tradition; the country with its infrastructure or farms have been used in different ways for years (Marcinkiewicz, 2013).

Agritourism is a form of rural tourism involving a tourist's stay on a farm (Jęczmyk, 2016). It offers different ways of spending one's leisure time, tourist services are provided on a farm (Sikora, 1999) and plant growing and animal breeding are major attractions (Majewski, 1994). According to Dębniewska and Tkaczuk, a tourism farm is a farm which not only deals with agricultural production (growing and breeding), but also provides tourism services, using natural resources and material goods to satisfy the tourists' needs (Dębniewska & Tkaczuk, 1997).

In Poland, there are over 1.4 million farms, and the average size of a Polish farm is about 10 hectares (Główny Urząd Statystyczny [GUS], 2016). Small farms must look for additional sources of income because they have ceased to be self-sufficient (Sikora, 2014). The development of agritourism on small farms is also recommendable for other reasons. For instance, farmers use very little artificial fertilizers and chemical pesticides, often for financial reasons, therefore they are able to offer ecological food products, even though they do not have formal ecological certifications (Sikora, 2013).

In 2014, the agritourism activity in Poland was run on over 8,000 farms (Figure 1.) offering 84,500 beds (Ministerstwo Rolnictwa i Rozwoju Wsi [MRiRW], 2015). Tourism farms include small ones, covering just a few hectares, where the tourism function predominates (mostly in southern Poland), as well as large ones, with a high product output where agritourism is a side activity (mostly northern Poland) (Balińska, 2005).

Figure 1 **Number of tourism farms in Poland 2002-2014**
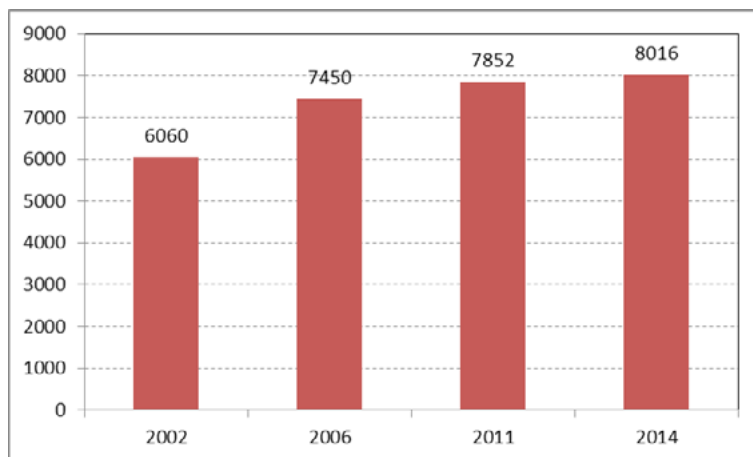
Most of the accommodation offered on Polish tourism farms (70-80%) are guest rooms, much more rarely separate flats and houses or camping sites. On average, a single tourism farm consists of five rooms with 10 beds (five double rooms) (Popkowska, 2015) and the average length of stay is approximately one week (Stefańczyk & Wąsik, 2016; Nowak & Korab 2012).

The number of five rooms on a tourism farm is regulated by the law, as based on the Income Tax Act, tax-free income is that gained from guest room rental to holiday-makers staying in houses located in rural areas, as well as income from providing catering for these people, if the number of rented rooms is not larger than five (Income Tax Act).

Agritourism activity contributes to the multifunctional development of the countryside because it offers the possibility of additional work to local inhabitants at their place of residence, improves the efficiency of using housing resources, makes it possible to use the crops by selling food produced on the farm or nearby, increases the general level of culture, improves the quality and aesthetics of the vicinity and its infrastructure, has an influence on nature protection, as well as integrates the inhabitants to cooperate in order to make their village and its surroundings more attractive (Trębowicz, 2011). Apart from accommodation and catering, more and more tourism farms offer additional attractions in their package, paying particular attention to the quality of the services they provide

(Jęczmyk & Maćkowiak, 2016). Culinary tourism is very popular; tourists discover the local cuisine through tastes, flavours and a whole range of sensations. Ecological food as well as regional and traditional products are promoted. Educational farms present a comprehensive educational offer (Jęczmyk & Bogusz, 2017), while care farms offer care services for children, the elderly and people with health problems (Instytutu Ekonomiki Rolnictwa i Gospodarki Żywnościowej [IERiGŻ], 2016).

The most important characteristic features of agritourism which make it different from mass tourism include its uniqueness and competitiveness (Kożuchowska, 2000). Tourists look for particular qualities of this form of tourism related to the following:

- a farm: the rhythm of farm life, farm work, presence of domestic animals, fresh, local food, smells, sounds, etc.;
- people (family): direct contact with the farmer's family, the possibility to learn about the family's customs, hospitality, new acquaintances and friends, everyday activities of country people;
- rural life: culture, customs, folklore, tradition and the history of the village and the region;
- space: contact with nature, freedom of movement, small traffic, quiet, peace, the possibility of recreation and sport (Wojcieszak, 2017; Sieczko, 2016; Uglis & Guth, 2015; Sikorska-Wolak & Zawadka, 2012; Kożuchowska, 2000). These are significant values attracting tourists to farms which provide tourism services.

From the beginning, agritourism has been an additional source of income for farmers. In the literature on the subject (Parzonko & Sieczko, 2015; Balińska & al., 2014; Krzyżanowska, 2013), it is stressed that although agritourism is not an economic activity according to the Polish law, it greatly contributes to the development of entrepreneurship, especially among women, enables farmers to raise their qualifications, makes it possible to preserve rural cultural heritage, as well as offers a chance to prevent young people from leaving farms.

Agritourism is not only an opportunity to stimulate/enliven rural areas economically, but also a way to propagate ecological thinking and respect natural environment (Uglis & Jęczmyk, 2009). It is a form of tourism, which makes it possible to protect natural and cultural heritage, enforces improvement and development of infrastructure, as well as improves prospects for the future. It prevents extensive changes in the natural environment and in the functioning of local rural communities, which inhabit areas visited by tourists. What is more, agritourism

contributes to the development of sustainable tourism and facilitates the implementation of sustainable development in rural areas.

4 Conclusions

In Poland, slow tourism is a new idea but it is gaining in popularity among tourists, especially those coming from large cities. It is a style of travelling which, due to the elimination of haste, enables them to make authentic contact with the environment and achieve peace of mind. The conception well embraces the form of resting offered by agritourism farms, enabling the visitors to stay longer and develop mutual contacts.

Slow tourism is a form of recreation which allows the participants to develop authentic and profound relationships with the countryside inhabitants, places, local culture and food, heritage and natural environment. On the one hand, this form of tourism offers tourists the possibility of slow rest, allows them to get to know the local community and its culture and customs, while on the other – it enables farming families to earn additional income from renting accommodation and selling extra tourist-recreational services, or local products.

There are many similarities between slow tourism / agritourism and sustainable, responsible tourism or eco-tourism. This type of recreation gives a range of permanent benefits to all the parties involved.

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THE STATE OF MANAGEMENT DEVELOPMENT IN AGRICULTURAL ENTITIES

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Abstract

The objective of this article is to present development of agriculture in the time horizon which involves the years 2000-2016. The indicators that reflect the development and state in the sector are related to the share of agriculture on GDP, employment, development of the average wage in agriculture and number of business entities operating in this sector. The results are based on database of the Slovak Statistical Office and the Green Reports, of the Ministry of Agriculture and Rural Development of Slovak Republic. Furthermore, the objective is to indicate the trends of management in the selected group of agricultural entities in current, complicated economic and social situation. As a source of data were used the results of a questionnaire survey in agricultural holdings of Slovak Republic. The results confirm that although managerial approaches and methods are significantly changing under the influence of multiple socio-political and economic transformations, managers have to pay more attention to aspects of external environment and innovation, to continual improvement of activities and processes and also to consistent application of innovative approaches. The research shows that the application of new methods in management has a positive impact on the prosperity of farms.

Keywords: *agricultural entity, development, trend, manager, management functions, management tools, management methods*

JEL classification: *M1, O13, Q10*

1   Introduction

The management system in the agriculture is exceptionally complex process. Management represented by Slovak farms/companies in EU framework has to face to the following main contemporary challenges: food self-sufficiency and food security, climate changes, environmentally issues, healthy food and the equal opportunities for all farmers (prices, equal payments, subsidies). In these circumstances, the great responsibility is hold by agricultural managers, especially at the implementation of managerial decisions in the real time. The managers in the agricultural farms/companies are facing on the one hand to the information asymmetry, while on the second hand they paradoxically do have to their disposal the huge amount of information, which is exponentially growing. However, the decision making techniques are lagging behind of this growth. The position of the agricultural managers in this way is becoming more complicated.

The objective of this article is evaluation of the current status of management in the selected farms/companies operating in Slovak Republic. Furthermore, the objective is to indicate the new trends of management in the selected group of agricultural entities.

In economic theory, innovation was first defined by Schumpeter (1934) as any way of "doing things differently". In this concept, Schumpeter included not only technological changes, but also improvement in infrastructures and markets, as well as organizational innovations. More recently, from a firm economic perspective, the Organization for Economic Cooperation and Development (OECD, 2005) and Eurostat (2005) also distinguished four broad types of innovations: on product, on process, on marketing method and on organization. The World Bank (2010) further explains this distinction defining innovation as "the dissemination of something new in a given context, not as something new in absolute terms". Therefore "what is not disseminated and used is not an innovation". Fresco (2016), in relation to agricultural innovation writes, that important innovations are expected in the field of genetics, ICT, bio - economics, or in optimization of the food chain. In this connection she suggests that future CAP has to resolve the agricultural restructuralization, foremost in the livestock sector, which is recently moving towards of the farms with higher concentration. Except of this, the livestock production tends to move more to the Central and Eastern Europe, where are among the other advantages, also the fact that environmental cost is lower.

Kádárová a Durkáčová (2012), as well as Karabašová (2010), analysed the use of managerial tools in the process of the enterprise 'performance growth. The conclusion is that on the highest positions of applied methods and tools are in domestic, as well as in global frame, the most important following factors: knowledge

management, strategic management, planning, alternatives, crisis management, formulation of missions and visions, orientation on key competencies, change management, CRM – relationships management with consumers' relations and others.

Recent preconditions on the market are highly competitive and permanently changing. This is causing the pressure on decision making process, management and changes implementation and on their utilization in favor of the business entities' growth. Kotter (2012) refers that we live in the period of more and more frequent changes. In the nearest years the speed of the changes will further to grow. New technologies will impact the all firms, even those which deal with traditional sectors, including of agriculture and food processing.

Stemming from the above mentioned authors and the outcomes of their research, in the submitted article we will deal with issues of innovation, new trends in management, organizational changes and status of management in the selected group of farms and agricultural companies.

2   Data and Methodology

In order to have the opportunity to compare conditions, levels and results of the farms/agricultural entities in different stages of their development, has been selected and processed quantitative data from years 2001 to 2016. These sources of quantitative data has been taken from the Green Reports in the years 2001-2016, also from the Information Letters of the Ministry of Agriculture and Rural Development of Slovak Republic for the same period, and also from various final reports of the Research Institute of Food and Agricultural Economics, as well as the statistical data published by the Statistical Office of Slovak Republic, had been used. With purpose to obtain primary information and qualitative data, had been realized a questionnaire survey.

In this connection have been addressed managers of the farms/agricultural companies. Questionnaires have been send in electronical form through the Google Forms and MS EXCEL 2016 program was used with table processor for primary data processing, their organization, adjustment and the graphical outputs and tables.

Hence, in Slovak Republic are existing diverse agricultural business entities in the sense of their size and legal forms, in the case of smaller entities up to 500 hectares, operated by one farmer or family is applied term - farm and for a larger business entity, the term – agricultural company.

3   Results

3.1 The Management Status in the Agricultural Entities of Slovak Republic

The aim of this part of scientific article is to evaluate development tendencies in production and economic activities, with purpose to identify the conditions under which the managers of agrarian sector have to perform their functions during the last 15 years. Except of this, will be portrayed basic characteristics of the surveyed group, furthermore, will be presented the results related to evaluation of recent status of management in farms/agricultural companies, as well as will be identified development trends in managerial competencies.

3.2   Production, Economic and Social Development Trends in Agricultural Sector from 2001 to 2016

Overall political, economic and social conditions under which agricultural managers are performing their missions and functions, underwent through significant changes. The major milestone and challenge for further economic and social development was accession of Slovak Republic (SR) to European Union (EU). This part deals with analysis of agricultural development starting with pre-accession period in 2001, continuing through development of the EU membership up to 2016.

   The importance of agriculture within a national economy is usually measured by its share on the total GDP. At the beginning of the analyzed period (2001) this indicator achieved value 3, 69 %. In 2004 and 2005, as the first and second year of our EU membership, the share of agriculture on the created GDP had been increased up the level of 4, 70 %. In the next years this value started continuously decline. It is worthwhile to mention that, more as the EU accession for the significant decline of this indicator was responsible the period of global financial and economic crisis (2008- 2010). The share of GDP dropped on the level of 2, 50 %. To the end of the analyzed period, share of GDP started to slightly increase. However, it never reached its former level. In 2015 the share of this indicator achieved 2, 4 %, what in comparison with 2001 meant decline about 1, 29 %. In 2001 in agriculture have been employed 106, 4 thousands persons. In 2010, despite of the implemented number of measures in favor of employment support, the expected stabilization of agrarian employment has failed. The one of the reasons is also the low wage during the whole surveyed period, which was below the level of average wages in national economy. In 2016 this indicator reached 827 Eur in agricultural sector. Recently, the wages development in agriculture is positive,

despite of the persisting disparity. This is a main cause that the interest about the work and entrepreneurship in this sector is low. This issue was also reflected in the declining number of business entities operating in agriculture. In the years 2001-2016, the number of business entities in agricultural primary production declined about 1 140. The most meaningful dropping happened in years 2001 and 2002 (most likely the drought impacts). Furthermore, the continuous decline was caused the EU accession, despite the fact that this had no detrimental effects on production results in agriculture. The most negative impact on the number of companies' bankruptcy had the financial and economic crises and this trend is continuing, virtually up to date. In 2014 the long-lasting continuous decline of employees working in agriculture had been stopped. This was result of diversification, production of higher value-added products and by growing incomes from non-agricultural activities, especially, from rural tourism, which meaningfully influenced the generation of new job opportunities. In general, we can state that number of employees in agriculture between years 2001 till 2016 declined on the level of 53, 9 thousands people (Figure 1).

Figure 1 **The Development of Employees Number in Agriculture in Selected Sectors with Organizations having 20 and more Employees in Years 2001-2016**
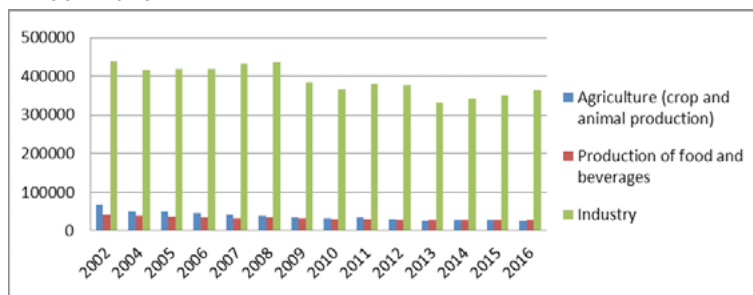
Source: Information Letters, Ministry of Agriculture and Rural Development 2001-2016; own elaboration.

This resulted into the introduction of new forms of employment, based on flexible approach. Flexibility in employment of working forces stems from seasonal nature of agricultural production, from its structure, as well as from ways for employees 'separation. In any case, this fact increases the requirements on organizational abilities and managerial competencies of agribusinessmen.

3.3 The Description of Selected Group of Farms and Agricultural Companies Involved into the Survey

26, 04 companies involved into the survey have been established more as ten years ago. 34, 38 % companies have been created more as twenty years ago, and 36, 46 % are operating in sector more than 30 years. From the obtained data is stemming out that number of newly formatted companies (they operate in sector less as 10 years), is low, only 3, 13 %. It is obvious that despite of transition process, EU accession had no detrimental effect on the companies which had been established prior the political and social changes before 1989. In our surveyed group the dominating share is represented by the farms which were established during the transition process. Those companies which had been created after EU accession, respectively they are still formed, are representing the modest share in the surveyed group.

The questionnaire survey was fulfilled by 96 top managers of agricultural entities. With regard of accomplished level of education, the university degree education has even 80, 2 % managers (77). 3, 1 % managers (3) have a PhD degree. 12, 5 % of them (12) managed to have secondary education, and only 4, 2 % (4) accomplished apprentice schools. This optimistic result is documenting good preparedness of managers for successful accomplishment of their functions, in the recent very demanding permanently changing circumstances. Six respondents with secondary or apprenticeships operate their businesses on small agricultural holdings.

Into the questionnaire survey have been included only 9, 7 % women, who are, managers, or owners of the surveyed farm/companies. This result can express in the one side the unequal opportunities at the selection of women into the managerial positions, or on the second side, eventual lower women's interest about the work in this sector caused by its nature and challenges.

3.4 The Status and New Trends in Management in Farms/ Agricultural Companies

The external environment in which is placed the firm is composed from two spheres (Slávik, 2013). The higher sphere is assigned the macro-economic surrounding composed from political, economic, social, legislative and technological environment. The lower sphere is called the sectorial surrounding which is containing from the factors which in direct way are affecting the position of the farm/agricultural companies.

Figure 2 **The Significance of the Selected Factors in External Environment**
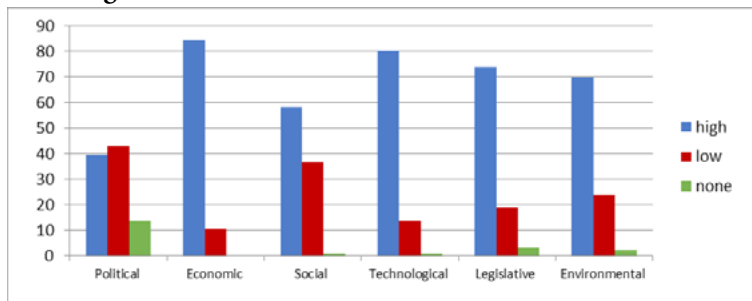
Source: Own elaboration.

The managers of the analyzed farms/companies consider as the most important in their external environment both economic and technological changes. In the second group are listed the legislative and ecological changes. The changes in the third group, both social and political, have the lowest impact on analyzed group, however, the average values are still high, even in comparison with first group of factors (Figure 2). It is reasonable to claim, that all the changes in the external environment of farms/agricultural companies analyzed according of six factors in the case of change, have a strong significant impact on agribusinessmen's performance. The decision making process and managers 'performance are affected by the changes and instability of the environment, but also by their personal competencies how to resolve in successful manner the subjects of the decision making process. Among the factors which represent for managers the biggest obstacles for their business development, from the external environment's point of view are important following: the state bureaucracy (68,4 %), insufficiently prepared strategy for sector development (57,9 %) and in its synthesizes part is limited attention dedicated to the concrete steps in favor of its fulfilment. Almost half of the respondents consider as very unfair the share of the primary producers on the profit in comparison with other participants involved into the same food chain. The significant obstacle is frequent turbulent changes in the business environment (legislation, energy prices-green petrol, administrative conditions for business etc.). 31, 6 % managers are complaining on the missing coordination at the sale' s activities through which would be possible to negotiate better price conditions. As a similar problem are considered frequent changes of the political elites both within a sector and government (31, 6 %). Less essential factors which have the impact on the farm/agricultural companies' lower performance are as follows: fear from the risk, unreliability of inputs suppliers, and underestimation of other competitors. Limited communication from the side of

partnering institutions, or luck of employees interest, as well as the absence of marketing management, these all represent the obstacles on the farms/agricultural companies' development. Very important factor for the development of agricultural company or farm, are well-functioning institutional sector's capacities. In the undertaken survey was therefore attention concentrated on the question that which sector institutions are considered by the agribusinessmen from the success point of view, as the most important. The achieved results unanimously are in favor of the Agricultural Paying Agency (81, 3 %), as well as Ministry of Agriculture and Rural Development (75, 8 %). Almost same results have been noted in connection to Slovak Food and Agricultural Chamber (74, 7 %). Approximately on the same level, have been evaluated the second group of institutions, among which are mentioned banks (37, 4 %), commodity and farm animals production' associations (36, 3 %), universities and research institutions (31, 9 %), Agrarian Chamber (30, 8 %), Agroinstitut which deals with long-life education in sector (27, 5 %), then Cooperatives and Trade Unions (20,9 %), as well as the insurance companies.

Upon the achieved results as the long-priorities of managers in farms/agricultural companies are considered the consistent profit growth (32, 26 %) and the higher investment with same deal. These two priorities are followed by the steadily growing market share (24, 73 %), marketing (11, 83 %) and new markets (9, 68 %) (Figure 3). It is obvious that last three listed priorities have been evaluated less eagerly in comparison with first two priorities. This approach is most likely the result of the fact that management in the farms/agricultural companies is not directly ensuring emplacement of their products on the markets. This part of responsibility in frame of food value chain is taken over by sales managers of other sale companies, eventually by the managers of the food processing companies.

Figure 3 **The Long-Term Priorities of Managers in Selected Group**
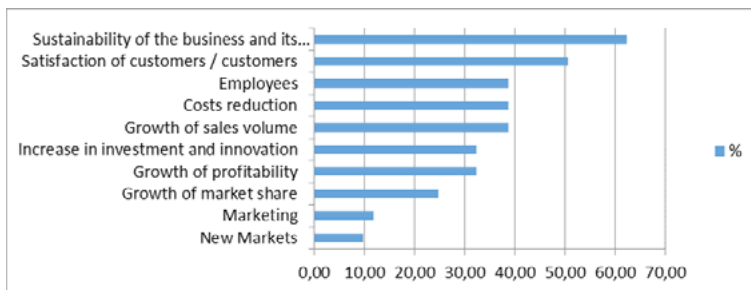
Source: Own results.

In more definitions of management as e.g. Bělohlávek et al. (2007) this human activity is defined as the process of systematic planning, organizing, leadership and control, which tends to the fulfilment of organizational objectives. The above mentioned activities in the definition do represent the management functions. The individual functions could be preferred by respective managers according of their capabilities and preferences, or according of the new trends in management, which are placing higher attention to the one or another managerial function. (Chart 1).

Chart 1 **The Importance of Managerial Functions According of the Managers in Selected Group**

Importance in% Management functions	high	low	none
Planning	83,2	16,8	0
Decision making	94,7	5,3	0
Organization	95,8	3,1	1,1
Leading of people	89,5	9,4	1,1
Motivation	85,3	12,6	2,1
Governance	84	14,9	1,1

Source: Own results.

In frame of carried out survey we followed that what importance is allocated by individual managers in order to be successful in business. To the above mentioned basic management functions were in addition added motivation and negotiations with external partners. In connection to the information boom, sometimes connected with information asymmetry, the great importance is assigned to the decision-making process. In the same time we can consider this function as the positive development trend, due to that through decision-making process could be in successful manner implemented business and personal capabilities of personal assumptions and business intensions of every managers. The dynamic approach to his own/ her own profession are expressing also importance assigned to organization function. Permanently changing prerequisites, volatile price development, climate changes, new programming periods for absorption of EU funds, including of adjusted and changing conditions of CAP (Common Agricultural Policy), these all require from managers both smaller and larger agricultural entities, that they will be excellent organizers and be able to adjust themselves to the volatility of political and social, business and environmental development.

Leadership was indicated in the respondent´s ranking, as the second most important managerial function. The leadership problem in agricultural business entity is recently more complicated from two reasons. First of all, that gradually less and less people have interest about the work in this sector, and secondly due to the production seasonality. In this way, there is the trend to prefer manually working staff's employment only on the certain, usually shorter period. Furthermore, due to the lack of working forces, more frequently are employed less qualified people. The last listed problem with growing work productivity in agriculture will become irrelevant. Digitalization and mass data, information as well as communication technologies will make possible to create a new production systems operating on the land and in the stables. For this new, revolutionary development system, have to be also prepared human resources at all managerial levels.

The last group is formed by activities, as do represent external partners and such managerial functions as planning, motivation and control. This result is to certain degree surprising. We have to be aware that into the research have been included 43 % business entities with size up to 500 hectares. So from Slovak point of view these farms/agricultural companies were smaller. In this case the planning is playing less important role, despite that has its sense, but not necessarily the plans are expressed in written form and they are usually drafted in less detailed manner.

In relation to the control the answers of top managers place this activity into the third group. Top managers from the all managerial levels should have the lowest deal on the control functions. In contrary, from top to down the share of control in the work of managers is increasing and in certain cases can reach even 35 - 40 % from their overall working time. (Bělohlávek a kol. 2007)

In line with earlier mentioned statement, the planning has most essential role in the work of top managers. In the carried out survey, the intention was to find the answer on the question that what kind of meaning is management assigning to the planning with special orientation on individual types of plans.

Taking into consideration, that answers have been provided by top managers, it is reasonable to assume that the largest meaning will be assigned to the strategic plans and to the visions, as well as to the mid-term plans, and vice versa, and that the lowest regard will be paid to the short-term plans. The contrary is true. Results are enough surprising, however, in line with what is typical for smaller farms and agricultural companies in last years at the last two decades. This is the result of inconsistent policies and numerous turbulences in sector. Agricultural businessmen, therefor prefer to plan their managerial works in shorter perspective, as they have to react on the challenges of given concrete and insisting situation.

4   Discussion and Conclusion

According of the Kenichi Ohmae (2005), the new economy is calling for specific knowledge and its application in the working processes. Knowledge management is focused also on the new trends of global entrepreneurship which are represented by associations and clusters. Their importance is also highlighted by Bureš (2007), Jemala (2009), Hess (2011). The problem of creation of inputs-supply associations is connected with transition period, which completely disturbed the previous relations. The membership in various associations is recently applied almost in half surveyed farms/agricultural companies. However, in comparison with results of the other studies, the results achieved by us, are more optimistic. According of Sedik (2016), this indicator has value of 3 % in Hungary, in Ukraine 0, 4 %. In contrary, in Italy its level results into 54 %, in USA and in France this indicator achieves 100 %. Challenges, connected to the business, are requiring from managers permanent attention devoted both to the farm/company's external, as well as to the internal environment Slávik (2009). According to our results, the most important changes in the external environment mainly relate to all economic and technological changes.

Upon the results of undertaken survey, we can state that decision-making process managers consider as the most important function in the recent circumstances. This is the positive development trend, because through decision-making is opportune to implement tasks and to fulfil the farm/agricultural company's objectives. The leadership is considered as important function due to the low attractiveness of the sector and demanding working conditions. The result linked to the control is in line with statement of Bělohlávek et al. (2007) that line managers on the lower management levels should have from their working time the highest share on the control. In majority of the cases this is around 35-40 %.

With regard of strategic management, this managerial tool is missing in the work of agricultural managers. In line with results of Filo (2013), in this research was also confirmed that strategic management does not belong among the priority tools of managers in farms/agricultural companies.

Diversification can help to agribusiness to enhance its competitiveness and to obtain additional financial sources for innovation and further development (Tothová, Fiľa, 2014). According of our results, diversification is the activity implied almost in every farm/agricultural company. 92, 71 % of analyzed entities consider diversification as very important for sustainability of production, economic and social functions.

Another new trend is connected to organizational and management structures in farms/agricultural companies. The organizational structures are more

simple in favor of functional or product structures. In larger companies are implied divisional structures.

The results achieved in our research compared with analogical research activities of the other authors, document that development trends, so in management of agricultural entities and in the other sectors of the national economy are analogical, despite of their specific features and differences. In any case the development trends in agriculture with its dynamic nature are lagging behind of industrial and service sectors.

The most significant impact on the new trends in management had the EU accession. In number of the farms/agricultural companies was indispensable to commence with various rationalization measures. From the obtained answers is clear that at least half of the business entities is implementing different measures, especially in field of management of human resources, in organizational structures, which became more lean and simple, in investments into new technologies and techniques, in the utilized production procedures and structures, also have been introduced different diversification programs, the farms/agricultural companies entered into various associations and clusters. Agribusiness entities undertook number of measures focused on the energy savings. The results confirm the certain problems in management, respectively, in the managers 'competencies in which is missing ability actively utilize marketing management. The before mentioned is confirming, that accession to the EU meant huge requirements, however competitiveness according of managers' expressions, it is the contribution and in the same time challenge of the higher demand at the achievement of higher competitiveness.

Acknowledgement

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MULTIDIMENSIONAL COMPARATIVE ANALYSIS OF THE LEVEL OF SUSTAINABLE DEVELOPMENT OF THE EUROPEAN UNION MEMBER STATES USING TAXONOMIC METHODS

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Abstract

The aim of the paper is an identification and assessment of the level of sustainable development of the European Union members states using taxonomic methods. The starting point for conducting the multidimensional comparative analysis was adopting three sets of diagnostic variables characterizing the level of sustainable development of the analyzed European Union members states in terms of their fundamental dimensions, i.e. social, economic and environmental. The main tool used for creating the ranking was the method of standardized sum of PERKAL indicator, which made possible conducting a classification procedure based on analysis and ordering objects described by means of many diagnostic variables. The paper used numerical data published by EUROSTAT in 2016. Performing the multidimensional comparative analysis for the regions in Poland and Slovakia allowed to order them according to the value of determined synthetic measure and classification to three groups revealing different levels of sustainable development. The results of conducted analysis indicate considerable differences of the studied objects both due to their economic, social and environment dimensions, and in the context of their sustainability level.

Keywords: *sustainable development, taxonomic methods, multidimensional comparative analysis, ranking, the European Union member states.*

JEL classification: *C43, Q51, Q56, R11, R58*

1   Introduction

New ideas and concepts usually originate in the minds of individuals or owing to collective wisdom. In case of sustainable development the second statement is the appropriate one (Bołtromiuk, 2011). The main reason why an intensive debate was initiated by the end of the seventies of the 20[th]century on creating a new approach to the problem of the world economic growth was apparently an increasing disparity between the level of development of individual countries and their regions resulting from the irrational model of natural resources management (Du Pisani, 2006). Currently, the paradigm of sustainable development plays an important role in modelling the attitude towards mutual social relationships, economy and the environment which translates itself into the intensity of changes of the way in which global and local economic systems function (Rogall, 2010). On one hand, the phenomenon seems a natural requirement of the time flow, on the other it may evidence more and more conscious responsibility for the fate of future generations (Paluch, 2013).

A different outlook on the place of modern man in the surrounding environment has been evidenced among others by the ideas of equivalence, sustainability and self-support of socio-economic and environmental development strongly embedded in the European and international legislation and legal order (Bugge & Voigt, 2008). Despite a scientific and institutional discussion, which has been going on for almost four decades, so far no detailed or universal method have been developed allowing undertaking the activities to guarantee full realization of principles and objectives of sustainable development on various levels of territorial units (countries, regions or cities) (Zhu & Hua, 2017). This state of affairs is caused, among others by a diverse approach to the ways in which sustainable development is assessed, which results from both the lack of explicit meaning of the term and its multidimensional character (Glavic & Lukman, 2007; Pater & Cristea, 2016). The issues mentioned above are characterized by complexity and unreliability, whereas their recognition and solving require a comprehensive and interdisciplinary understanding. Therefore, scientists and institutional experts, who want to use the appropriate methodology constantly develop new modifications for the measurement and assessment of sustainable development. However, most of these proposals focus mainly on the assessment of its compliance with the objectives stated in the strategic and planning documents of national or international importance, while often omitting the analysis of homogeneity of changes in various economic systems over space and time (Liu, Brown & Casazza, 2017). It is commonly believed that a new paradigm of world development implementation should be based on the ability to establish whether it meets and will meet in future

the criteria of equality and sustainability of social, economic and environmental changes, or will be unable to meet them (George, 1999).

Due to its multidimensionality, sustainable development requires the publication of appropriate methods and determining the sets of quantifiable measures (features, variables, indices), which despite the limitation of sources will allow to conduct potentially detailed comparative analysis of the individual dimensions (components) of development of countries and their regions over time and space (Robert, Parris & Leiserowitz, 2012; Szopik-Depczyńska, Cheba, Bąk, Kiba-Janiak, Saniuk, Dembińska & Ioppolo, 2017). In case of measuring and assessment of such complex process, the key aspect becomes a necessity to reconcile the description of its permanence and sustainability in the social, economic and environmental dimension with the requirements of comparability, simplicity and easy applicability of the diagnostic variable which describes it. However, creating the measures of this kind is not easy. Selection and the way in which they are used, which in each situation constitutes a resultant of the data availability and arbitral decision of a scientist, determine the results of conducted analyses providing a basis for the projection of system changes serving for the implication of efficient solutions in diverse conditions of development of individual territorial units (countries, regions and cities). Therefore, for some decades, a measurement of sustainable development level has been a sphere of scientific research, where the prerequisite for obtaining reliable information means developing an appropriate set of indices, methods and tools for its assessment (Hassan, Haddawy & Zhu, 2014; Balas & Molenda, 2016).

So, the aim of the paper is an attempt at application of the PERKAL method of standardized sums, which is one of taxonomic methods, to conduct a comparative analysis of the sustainable development level in the European Union member states.

2   Data and Methods

Taxonomic methods are among the statistical tools which are the most frequently used to research complex phenomena . The starting point in a taxonomic analysis is a set of objects (e.g. countries, regions or cities) which are the subject of research, characterized by means of a set of diagnostic variables (features and indices) (Kukuła, 1999). The main idea behind the methods of this kind relies on passing from multidimensional arrangement of features to unidimensional arrangement through their aggregation based on model or non-model formulas (Bąk & Szczecińska, 2014). The measurement and assessment of a complex phenomenon are therefore conduced in the context of numerical description of its

individual spheres, dimensions or components constituting the value of synthetic variable or synthetic measure, which is a function combining into one all partial information carried by the assumed set of diagnostic variables. Another property of a synthetic measure is its possible application for the assessment of disproportions occurring in a given space and time horizon (Paluch & Satoła, 2017). The synthetic measure created on the basis of diagnostic variables is devoid of identity, which allows it to be used for constructing a ranking and dividing the objects into groups of diversified level of the studied phenomenon development. At present it is difficult to disregard a considerable importance of rankings of various sets of objects made on the basis of predetermined criteria. At so fast information flow observed currently their results may provide a basis for decision making and activities targeting economic, social, environmental, institutional or political changes (Kukuła, 2000).

One of the statistical tools used in the research on multidimensional phenomena is PERKAL method of standardized sums, which belongs to the group of taxonomic methods. Its basic instrument used during linear ordering of objects characterized by many diagnostic features, called PERKAL indicator (*SWP*), which is a function combining partial information carried by the set of diagnostic variables assumed for the analysis. The method comprises four successive stages: selection of features, their standardization, construction of synthetic measure, ordering and classification of objects according to the level of the analyzed phenomenon (Brol, Kusideł, Maciejuk, Markowska, Obrębalski, Sobczak, Strahl, Sztando & Zapart, 2006) (Figure 1).

Figure 1 **Simplified scheme of the objects classification procedure using taxo-nomic methods**
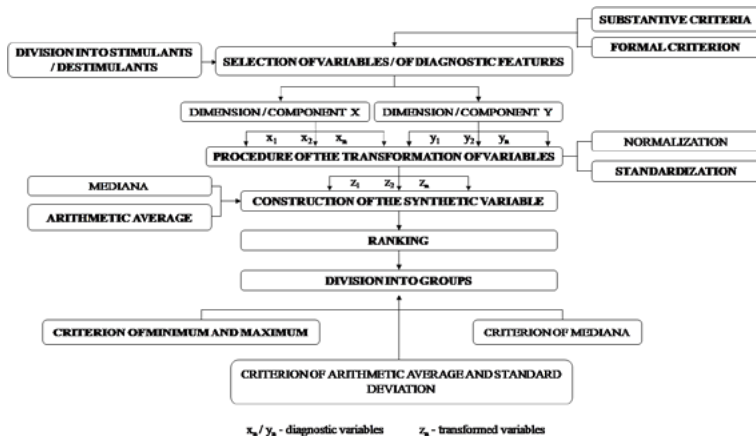
Source: Author`s elaboration based on Paluch, 2015.

The starting point for the comparative analysis on the level of sustainable development using the PERKAL method of standardized indicators sum was therefore suggesting three sets of diagnostic variables (features) characterizing its basic dimensions, i.e. social, economic and environmental. The main source of numerical data for the research was provided by the European Statistical Office (EUROSTAT) database and at their selection it was assumed that they would refer to 2016-2017, would be reliable, precise, comparable, adequate and complete concerning the time and space (Grabiński, 1984). The selection of the final list of diagnostic variables from among the available statistical data published by EUROSTAT was based on the substantive criteria, including the aim, subject of research and its time frame and formal criterion comprising testing the strength of correlation relationship between diagnostic features and the level of their variability (Table 1).

Table 1 **Final set of diagnostic features**

Social dimension (so_n)		Year
$so_{1(S)}$	activity rate (% of total population aged 15-64)	2016
$so_{2(S)}$	rate of migration (per 1 000 inhabitants)	2016
$so_{3(S)}$	employment in high and medium-high technology manufacturing sectors and knowledge (% of total employment)	2016
$so_{4(D)}$	people at risk of poverty or social exclusion (% of total population)	2017

Social dimension (so$_n$)		Year
so$_{5\,(S)}$	adult participation in learning (% of population aged 25-64)	2016
so$_{6\,(S)}$	total fertility rate (number of children per woman)	2016
so$_{7\,(D)}$	low reading literacy performance of pupils (up to 15 years old)	2016
so$_{8\,(D)}$	housing cost overburden rate (% of the population living in a household where total housing costs represent more than 40% of the total income)	2016
Economy dimension (ec$_n$)		
ec$_{1\,(S)}$	real GDP per capita in PPS (EU28 = 100)	2016
ec$_{2\,(D)}$	HICP inflation rate (%)	2017
ec$_{3\,(S)}$	total investment by institutional sectors (% of GDP)	2016
ec$_{4\,(D)}$	general government gross debt (% of GDP)	2016
ec$_{5\,(D)}$	total unemployment rate (%)	2017
ec$_{6\,(S)}$	R&D expenditures (% of GDP)	2017
ec$_{7\,(S)}$	eco-innovation index (EU28 = 100)	2016
Environmental dimension (en$_n$)		
en$_{1\,(D)}$	gross inland consumption of energy divided by GDP (kg of oil equivalent per 1000 EURO)	2015
en$_{2\,(D)}$	greenhouse gas emissions index (in CO_2 equivalent, base year 1990)	2015
en$_{3\,(S)}$	shares of environmental and labour taxes in total tax revenues from taxes and social contributions (%)	2016
en$_{4\,(S)}$	electricity generated from renewable sources (% of gross electricity consumption)	2016
en$_{5\,(D)}$	generation of municipal waste per capita (kg per person)	
en$_{6\,(S)}$	environmental tax revenues (% of GDP)	2016
en$_{7\,(S)}$	protected forests and forests under Natura 2000	2015
en$_{8\,(S)}$	resource productivity (EURO per kg)	2016
en$_{9\,(S)}$	area under organic farming (% of UAA)	2016

Source: Author's elaboration based on data base of European Statistical Office. Retrieved from http://ec.europa.eu/eurostat.

In order to test the assumed set of variables in terms of fulfillment of the formal requirements, the assumption was made that they should be weakly correlated among one another and reveal relatively high degree of variability. The degree of their interrelationship was tested by means of PEARSON correlation coefficient (r_{ij}), and in order to eliminate the features of high interrelationship, it was assumed that two highly correlated variables are carriers of similar information,

so one of the pair is useless for the analysis. Linear correlation coefficient (r_{xij}) may assume values from [-1,1] range, where the value r_{ij}= 1 or -1, indicates that a functional dependence occurs between a pair of variables, whereas if $r_{ij} = 0$, the tested features are not correlated, which means that no bonds occurs between them (Stanisz, 2006). The range of variability, i.e. diversification of diagnostic variables values within the set of analyzed objects was determined using variation coefficient ($V(x_{ij})$ expressed in percent. It is commonly believed that the value of variability of the set of features for which ($V(x_{ij}) \leq 10\%$ should not be used to seek the causative agents of the investigated phenomenon. Therefore, diagnostic variables for which ($V(x_{ij})$ does not fulfill the inequality $0 \leq V(x_{ij}) \leq 0,1$ are "quasi-fixed" variables, so it should be eliminated from further analysis (Parris & Kates, 2003).

An important stage of selection of features describing individual dimensions of sustainable development was also determining the influence of individual features on the investigated phenomenon. Their character was identified by stating whether the variables assumed for the analysis represent a positive or negative effect on its course. Testing their identity led to the classification of individual features to one of the two subsets, i.e. stimulants (S), whose higher values indicate a high level of the studied phenomenon level or destimulants (D), where their high values evidence a distant position in the constructed ranking. In case of diagnostic variables assumed for the assessment of sustainable development of the EU countries, the stimulant set was composed of : $so_1, so_2, so_3, so_5, so_6, ec_1, ec_3, ec_6, ec_7, en_3, en_4, en_6, en_7, en_8, en_9$, whereas the following ones obtained the status of destimulants: $so_4, so_7, so_8, ec_2, ec_4, ec_5, en_1, en_2$ and en_5.

Identification of diagnostic variables character was a basis for their transformation process in order to lead to comparability. These features are expressed by means of various measurement units, with various accuracy and their values area is characterized by different range of variability. Therefore it was necessary to unify and set a fixed span range for their values. The tool used for the unification of selected diagnostic features was standardization method, which constitutes such a form of quotient mapping, in which the values of standardized feature (x_{ij}) or this feature diminished by its arithmetic average $lnNCE = lna + b_1 lnNGMWE + b_2 lnRPR$ are referred to the values of standard deviation ($S(x_j)$). One of the oldest and most frequently used methods standardizing diagnostic variables, i.e. bringing them to abstract numbers with unified order of magnitude is standardization based on the formulas presented below (Perkal, 1953):

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S(x_j)}, \ x_j \in S, \ z_{ij} \in \ \frac{min\bar{x}_j}{S(x_j)}, \frac{maxx_{ij} - \bar{x}_j}{S(x_j)} \ \ (1)$$

$$z_{ij} = \frac{\overline{x}_j - x_{ij}}{S(x_j)}, \; x_j \in D, \; x_{ij} \in \frac{\overline{x}_j - \max x_{ij}}{S(x_j)}, \frac{\overline{x}_j - \min x_{ij}}{S(x_j)} \quad (2)$$

where: z_{ij} – value of diagnostic variable after standardization, x_{ij} – value of diagnostic variable, $NCE = 1.77 * NGMWE^{0.82} *$ – arithmetic average, $\overline{S}(x_j)$ – standard deviation, S – set of stimulants, D – set of destimulants.

The standardized features were then used for constructing PERKAL indicator (*SWP*), whose property is ordering a complex phenomenon by means of a single numerical measure, in this case the arithmetic average (Młodak, 2006)

$$SWP = \frac{\sum_{i=1}^{n} z_{ij}}{n}, \; (i = 1, 2, \dots, r)(3)$$

where: *SWP* – value of PERKAL indicator, z_{ij} – value of diagnostic variable after standardization, n – number of investigated objects.

The values of determined PERKAL indicator (*SWP*) allowed to establish a ranking of the EU member countries according to their development level in the socio-economic ($SWP_{so\text{-}ec}$) and environmental (SWP_{en}) dimensions. This index also made possible the classification of the studied objects to three typological groups with diverse level of development (Table 2).

Table 2 **Criteria of the EU countries division into groups with diversified levels of socio-economic and environmental development**

Group	Criteria of division
I$_n$	max(SWP) - 1/3[max-min (SWP)] ≤ SWP ≤ max(SWP)
II$_n$	max(SWP) - 2/3[max-min (SWP)] ≤ SWP ≤ max(SWP) - 1/3[max-min(SWP)]
III$_n$	min (SWP) ≤ SWP ≤ max(SWP) - 1/3[max-min(SWP)]

Source: Author`s elaboration based on Kukuła, 2000.

Basing on the determined values of PERKAL indicators ($SWP_{so\text{-}ec}$/SWP_{en}) and affiliation of the studied EU countries to the groups with diversified level of development in the socio-economic ($I_{so\text{-}ec}$/$II_{so\text{-}ec}$/$III_{so\text{-}ec}$) and environmental (I_{en}/II_{en}/III_{en}) dimensions, they were classified to three typological groups representing different levels of sustainable development (A/B/C) (Table 3).

Table 3 **Criteria of the EU countries division into groups with diversified levels of sustainable development**

Group	Criteria of division
A	$SWP \in I_{so\text{-}ec} \wedge I_{en} \vee SWP \in I_{so\text{-}ec} \wedge II_{en} \vee SWP \in II_{so\text{-}ec} \wedge I_{en}$
B	$SWP \in II_{so\text{-}ec} \wedge II_{en} \vee SWP \in I_{so\text{-}ec} \wedge III_{en} \vee SWP \in III_{so\text{-}ec} \wedge I_{en}$
C	$SWP \in II_{so\text{-}ec} \wedge III_{en} \vee SWP \in III_{so\text{-}ec} \wedge II_{en} \vee SWP \in III_{so\text{-}ec} \wedge III_{en}$

Source: Author`s elaboration.

The minimum and maximum values of PERKAL indicator were used for the groups formation, and the presented division criteria indicate, that the higher the value assumed by the synthetic measure (*SWP*), the higher the level of the phenomenon which characterizes a given object, which caused its classification to individual group in an ascending order, i.e. group I or A is composed of the objects with the highest level, units with medium levels were classified to group II or B, whereas group III or C comprises objects with the lowest level of the studied phenomenon development.

3   Results and Discussion

In the subject literature one may frequently encounter a statement that apparent disproportions concerning the level of socio-economic and environmental development, as compared with the "former fifteen" (EU-15) countries, refer particularly to the Central and East European countries, which joined the European Union after 2004, i.e. Cyprus, Czech Republic, Estonia, Lithuania, Latvia, Malta, Poland, Slovakia, Slovenia, Hungary and Croatia (Stec, 2008; Dominiak & Churski, 2012, Bluszcz, 2016; Maciejewski, 2017). The results of the assessment of sustainable development level by means of PERKAL method provoke similar conclusions (Table 4).

Table 4 **Division of the EU member countries into groups with diversified level of development in the socio-economic and environmental dimension**

Member States	SWP so-ec	Group	SWP en	Group	Member States	SWP so-ec	Group	SWP en	Group
Austria	0.47	I	0.28	II	**Italy**	-0.39	II	0.17	II
Belgium	0.07	II	-0.22	III	**Latvia**	-0.34	II	0.68	I
Bulgaria	-0.80	III	-0.38	III	**Lithuania**	-0.48	II	-0.22	III

Member States	SWP so-ec	Group	SWP en	Group	Member States	SWP so-ec	Group	SWP en	Group
Croatia	-0.54	II	0.26	II	Luxembourg	0.44	I	-0.47	III
Cyprus	-0.61	III	-0.57	III	Malta	0.02	II	-0.46	III
Czech Republic	0.44	I	-0.12	III	Netherlands	0.45	I	0.12	II
Denmark	0.87	I	0.29	II	Poland	-0.23	II	-0.11	III
Estonia	0.12	II	0.15	II	Portugal	-0.38	II	-0.04	II
Finland	0.79	I	0.05	II	Romania	-0.70	III	0.11	II
France	0.37	I	0.19	II	Slovakia	-0.08	II	-0.13	III
Germany	0.61	I	-0.34	III	Slovenia	0.16	II	0.29	II
Greece	-1.38	III	0.13	II	Spain	-0.35	II	-0.24	III
Hungary	-0.12	II	-0.23	III	Sweden	1.02	I	0.45	I
Ireland	0.41	I	-0.35	III	United Kingdom	0.17	II	0.13	II

Source: Author's elaboration based on data base of European Statistical Office. Retrieved from http://ec.europa.eu/eurostat.

The division of the analyzed community in terms of the socio-economic development level reveals that from among the above mentioned countries Bulgaria, Romania and Cyprus were included in group III (with the lowest level of development). Although Lithuania, Latvia, Poland, Hungary and Slovakia were classified within group II (with medium level of development), yet worthy of note are their low values of synthetic measure (*SWP*), which considerably differ from the other countries in the same group. Czech Republic is the exception among the so called "new" EU member states, as together with Sweden, Denmark, Finland, Germany, Austria, Holland, Luxembourg, Ireland and France was classified to group I (with the highest level of development). It should be also noted that the group of units with the highest level of socio-economic development does not contain the Mediterranean countries (Greece, Portugal, Spain or Italy) which, despite the economic success in the initial years after their accession into the EU, currently face serious social and economic problems being the aftermath of the global economic crisis (Piecuch, 2017).

Considering the EU countries assessment in the environmental dimension, the Scandinavian countries (Sweden, Denmark and Finland) received one of the top marks. They are characterized by a Nordic model of development based on

a long-standing tradition of economic and political cooperation and activities focused on the shaping and protection of the natural environment. The cooperation contributed to an intensive rate of economic growth and development of a social and environmental culture, unique in the world, focused on implementation of sustainable and permanent development concepts, which should be an example for other EU countries (Zapędowska-Kling, 2013; Frączek, 2014). It has been substantiated by the fact, that according to the conducted assessment the countries were classified as the units with the highest level of sustainable development (Figure 1).

Figure 1 **Spatial diversification of the level of sustainable development in the EU member states**

Source: Author`s elaboration.

The following countries were classified to the group with the lowest level of sustainable development: Cyprus, Greece, Spain, Lithuania and Malta. It is worth noticing, that also the countries of the Visegrád Group, i.e. Poland, Hungary,

Slovakia and Czech Republic were included in the same group, which despite similarities, such as their location, level of development and economic history, differ considerably from one another by their way of carrying out social, economic and environmental policy, which may be evident as a lack of coherence and consequence in the issues concerning the shape of sustainable development in the Central and East European countries (Drews, 2016).

The European Union and its legal, political, institutional and market structures constitute a form of the countries integration, unique in the world. The countries connected with one another by a number of supranational treaties constitute a significant socio-economic and environmental force in a global context (Dunning & Ludan, 2008). As indicated by the results of conducted assessment, on one hand, the diversity of the economies of the old continent countries is the driving force for their competitiveness in the world, on the other causes many difficulties in the harmonious and effective implementation of the measures for the sustainable development. Because of big and constantly increasing disparities among the EU countries and regions, reducing the internal disproportions has been one of its main strategic objectives, yet so far no balance in this area has been achieved (Grupa &Kozieł, 2015). Irrespective of the regional policy implemented in the Community and supported by its instruments, such as the structural funds, loans from the European Central Bank and Cohesion Fund, so called "new " EU members have been unable so far to catch up on the considerable differences in relation to EU-15 countries. The differences limit their development possibilities, which decreases the dynamics of the integration processes inside the EU, therefore making difficult realization of goals and assumptions of the development paradigm based on the permanence and sustainability principles.

4   Conclusion

Conducted research allows to conclude that, because of diversified conditionings (causative agents), sustainable development of the EU countries does not progress evenly in spatial terms. The diversifying factors are both socio-economic and environmental resource, which usually initiate the concentration of material and financial capital, thus determining the character and rate of changes concerning human settlement, structure of economy and labour market, but also those concerning technical infrastructure, financial situation, innovation of economy and its institutional environment, as well as the state and quality of the natural environment. Their occurrence more and more frequently becomes also a limitation to the realization of the main objectives sustainable development, i.e. equality, permanence and self-sustainability of the socio-economic and environmental

development. Another barrier in this respect may be posed also by increasingly more apparent disproportions in the level of development, which deepen the phenomenon of economic polarization, which usually enhances the process of changes in highly developed areas at the simultaneous plunging into stagnation of underdeveloped regions.

Application of PERKAL method of standardized sum, which belongs to the taxonomic methods group, allowed to identify the diversification of the sustainable development level in the EU member countries. It is worth noticing, that an undoubted advantage of the applied methodological approach is a possibility to conduct a multidimensional comparative analysis not only in the spatial but also time context. Taxonomic methods base on rankings, where a change of a given object position reflects the results of changes occurring in time and space, in which the object is situated. Presented results may be therefore used in the subsequent years to follow the directions of changes of the development level in the EU countries in three main dimensions, i.e. social, economic and environmental. However, one should keep the obtained results in perspective because of the effect of external agents, usually unpredictable, which may undoubtedly disturb a number of initiated development processes in the community, postponing or even eliminating the expected results of model activities, particularly in view of new challenges which EU faces, including economic crises, global migration processes or so called BREXIT.

Acknowledgements

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SUPPORT OF YOUNG FARMERS IN KENYA IN THE CONTEXT OF SUSTAINABLE AGRICULTURE

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Abstract

Sustainable development and agricultural production represent intensively explored issues in many ways today. Their importance has been rising because of growing global problems and population. This is in particular the case of the global South – poorer, less developed – countries with weaker economies. In this respect, the concept of sustainable agriculture and its implementation in practice has becoming important. The goal of this paper is to present the need for implementation of sustainable agricultural practices in the global South countries, but mainly to examine the current perspectives of sustainable agriculture in Kenya, as a selected developing country, fighting with many problems of global nature. It is a country where about 35 percent of population are in age from 15 to 34 years, and where is a big need for effective sustainable agriculture practices. But to do so there is also a need to support young people in the field of farming. The article will then present the level of this supports from the government and in the context of international development through various mechanisms. In the end we will present the current status in analysed areas and a broader view on the examined issues.

Keywords: *Sustainable development, sustainable agriculture, global South countries, sustainable agricultural production in Kenya, support of young Kenyan farmers*

JEL classification: *Q01, Q18, I38*

1   Introduction

Sustainable development represents still current and important concept with raising position in entire international community. The contemporary world is endangered by many problems which have already gained the global nature and threaten the entire world, although in various extent and power. One of such problems is also the growing population on the one hand and huge hunger on the other hand. This is the case of most less developed countries.Therefore, there are still more often and deeper efforts to build and implement a worldwide rules and goals to support and ensure sustainable development in combination with sustainable agricultural production. It is quite complicated conjunction. The concept of sustainable development relates to many problems that are endangering the world. The aim of international community is therefore an intensive effort to mitigate these problems and achieve the status development sustainability. However, industrial agriculture is, on the other hand, the cause of many environmental problems and pollutions that must be reduced in achieving world sustainability. In this respect, the concept of sustainable agriculture and its enforcement as well as its implementation in individual countries is becoming increasingly important.

An important prerequisite for these efforts to be successful is to spread the needed information and knowledge about the current situation and problems of this world, and how it is needed to act to support its sustainable development. As "the growing sociocultural burden of nature connected mainly with the development of consumption economy seriously threatens lives of future generations" (Svitačová – Moravčíková, 2017: 196). However, there are many possibilities for people to act as responsible local and global citizen in these issues. The situation is even more problematic in less developed countries, because even they cause the global problems with their very existence in much lower extent than the more developed countries, they suffer to their consequences much more. These countries struggle with many problems which are directly affecting and threaten their very existence. As they usually do not have the finances for solving their problems which are often caused by irresponsible acting of richer countries the duty of the entire world community is to adopt the common goals to help developing countries face their problems more effectively and reduce them as an obstacle in achieving sustainable development of the world.

The countries of global South are more focused on the agricultural production than to industry. As the agriculture contributes to the environmental pollution in many ways today we can see the growing impact of the concept of sustainable agriculture which should be supported in wider extent also in these countries. Therefore, this paper will present and analyse shortly the need for support of

sustainable agriculture in less developed countries. Then, the main aim is to examine and analyse the current state and perspectives of sustainable agriculture in Kenya, as a selected global South country, which belongs to the countries struggling with the hunger, lack of resources and intensive impact of global problems on the one hand, and with the constant population growth on the other hand. According to the statistics, more than half of the Kenyan population are young people under the age of 24 (PopulationPyramid, 2017), therefore spreading of knowledge in agriculture and sustainable development has been reaching a considerable importance as well as the support of young people in the field of farming. For this purpose, we will examine also this support from the government as well as in the context of international development aid made through the education, and through the other mechanisms.

2   Data and Methods

This research study arises from the qualitative research coming from the theoretical analysis of the current state and perspectives of sustainable agriculture in Kenya, as selected less developed country, and of the support of young Kenyan farmers in the context of this strategy. For this purpose, we are going to use several scientific methods during our research. We will map, describe and identify the importance and the state of sustainable agriculture in developing countries generally. Then, we will explore, analyse and determine specific mechanisms for support of sustainable agriculture practices in Kenya as a selected developing country as well as mechanisms of young farmers support there. The results will enable us to see the current status in analysed area, and to make our own outcomes in examined issues to broaden our scope.

2.1   Strategy of sustainable agriculture in global South countries in the context of sustainable development

One of the biggest challenges for sustainable development is the globalizing world, largely marked by poverty (Elliot, 2006). The very concept of sustainable development has passed after quite a long development up to now. Its main history started in 1984 when the United Nations established a group of people from global South and global North countries and charged them with identifying the long-term sustainable strategies for entire international community. The result was the report named "Our Common Future" known as Brundtland Report (World Commission on Environment and Development, 1987) which defined sustainable development as "development that meets the needs of the present

without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 43). It was an important moment which put sustainable development firmly into the political arena of international development thinking (Elliot, 2006). After this the importance of sustainable development has risen in the international field and many conferences were organized from this time with an effort to find common goals, define the global problems, and try to find and achieve solutions together on the international arena. Countries of global South are very interested in these actions too as they struggle with many problems of global character that endanger sustainability of the world, more intensively than the countries of global North.

Important milestone in these actions was the Millennium Summit in 2000 and the Millennium Development Goals (MDGs) (UNDP, 2000) containing the most endangering problems of the world in that times. These goals were adopted with the duty that international community will solve them together until the year 2015. Unfortunately, this aim was not successfully achieved but it represented a significant starting point in continuing these efforts. In 2015 there were adopted new Sustainable Development Goals (SDGs) (UNDP, 2015). International community had been working to prepare them adequately for a very long time and they paid significant attention to remove failings from previous determination of the MDGs, and again limited their solving until the year 2030. These 17 goals and 169 targets reflect aspirations for sustainable development of the global community, and together with the Agenda 2030 for sustainable development (United Nations, 2015) they go much deeper than the MDGs addressing the universal need for development that works for all (UNDP, 2015). They have been set to facilitate the realization of results achieved at the important summits in the economic, social and environmental area, with accent on sustainable development. They pick up on MDGs but dispose with closer specification. Important is a big support of global South countries and the significant effort for removing regional inequalities in the goals content.

All goals are important in ensuring sustainable development and sustainable agriculture belongs among them. "More than ever today, development that respects the value of the natural environment is necessary, especially for those beset by poverty and whose natural resources are being degraded by the adverse impact of current patterns of economic and social activity and lack of protection from natural disasters" (Strachan – Vigilance, 2011, p. 1). Therefore, it is more than needed to develop good and sustainable strategies in all sectors, as well as in agriculture in developing countries to support sustainable development and reduce global problems that harm them significantly. Especially the environmental

problems which belong among the most visible and most urgent ones (see more in Sťahel, 2010; Sťahel, 2016).

2.1.1 What is sustainable agriculture?

Agriculture has changed its nature a lot mainly after the World War II. There are modern technologies, mechanization, chemical use, specialization and policies that favoured maximizing production. Industrial agriculture produces huge quantities of food at low prices. However, this is possible only by implementing practices that threaten the environment, health, rural communities, animals, etc. So, despite the many positive impacts there have also been significant costs which influence the sustainable development. The most important are topsoil depletion, groundwater contamination, degradation of rural communities, lowered conditions for farmworkers, increased productions costs, etc. A growing movement has emerged during the past decades to question the role of the agricultural establishment in promoting practices that contribute to these problems. Today, this movement for sustainable agriculture is garnering increasing support and acceptance within mainstream agriculture. Not only does sustainable agriculture address many environmental and social concerns, but it offers innovative and economically viable opportunities for growers, labourers, consumers, policymakers and many others in the entire food system (UC Davis Agricultural Sustainability Institute, n. d.). Therefore, today we can see promoting of "obvious changes in land use and the impact of human activity upon the planet's ecosystem, and the constraints on human activity imposed by limits of the system" (Šeben Zaťková, 2015: 1144).

The concept of sustainable agriculture generally integrates several main goals – environmental health, economicprofitability, social and economic equity. Reaching toward the goal of sustainable agriculture is the responsibility of all participants in the system. The main goal of sustainable agriculture is therefore to meet society's food and textile needs in the present without compromising the ability of future generations to meet their own needs. Every person involved in the food system can play a role in ensuring sustainable agricultural system (UC Davis Agricultural Sustainability Institute, n. d.). In this context, sustainable agriculture in the simplest terms means the production of food, fibre, or other plant or animal products using farming techniques that protect the environment, people, and animals. This form of agriculture enables people to produce healthful food without endangering future generations´ ability to do the same (Grace Communication Foundation, 2018).

So, we can summarize that the agriculture sustainability is a complex idea with many faces, including the economic (a sustainable farm should be a profitable

business that contributes to a robust economy), the social (it should deal fairly with its workers and have a mutually beneficial relationship with the surrounding community), and the environmental (good stewardship of the natural systems and resources that farms rely on). Among other things, this involves: building and maintaining healthy soil; managing water wisely; minimizing air, water, and climate pollution; promoting biodiversity, etc. Farms, using these principles, can avoid damaging impacts without sacrificing productivity or profitability (Union of Concerned Scientists, n. d.).

Importance of sustainable agriculture has been growing. It is the SDG 2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture. Especially the target 2.4 is important – By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality (UNDP, 2015).

2.1.2 Sustainable agriculture and support of farmers in global South countries

We can state that realizing sustainable agriculture needs new efforts in development, research and implementation. One of the most important in this is dedicated stewardship. Absolutely necessary is a commitment at the highest levels of government. This must be coupled with an action program that addresses the needs of farmers in the context of the environment and public awareness of the problems caused by this model. There is a big need to support sustainable agriculture, create market for sustainable foods, and form demands for agricultural policy and regulatory reform. Supporters of industrial agriculture claim that only this type of agriculture can feed so huge world population. That is not true. According to scientists the proper implementation of sustainable agriculture techniques can be more effective in this goal and can also protect and sustain environment. Therefore, there is a need to support spreading knowledge and information about this new strategy among people, groups, entire nations and their decision-makers. People all over the world and especially in agricultural countries of global South need to be educated about problems of the world, about the unsustainability of the industrial agriculture, and about the benefits of sustainable agriculture strategy.

International community and more developed countries should help those less developed mainly by providing tools and resources to help also consumers make better food choices, provide them detailed information about the food system, teach people to shop and cook sustainably, to use the food sustainably, etc.

Maintaining sustainable agriculture is even more important in developing countries for low-input and resource-poor farmers. In this context, there is a need for educating people, show them the long-term consequences of their traditional methods in current agriculture, and help them develop and implement innovative, appropriate farming practices. There is a need also for financial and technical assistance, without which the sustainable agriculture in these poor countries will be untenable in future. This essential support could be considered as an investment to ensure food security and social stability in the world (Blumenthal, 2018).

Many developing countries still do not have detailed information about this strategy. Therefore, highly trained professionals need to be formed to conduct effective resource inventories. Equally important is the creation of awareness among people – especially young people and support farming as a job which have important future in these countries.

Sustainable agriculture has been gaining still bigger importance in every part of the world and especially in developing countries which are more focused on agricultural production, struggling with many problems like hunger, constant population growth, lack of basic resources, and harmed environment. As just the agriculture damage environment in a quite serious extension it is necessary to train these countries in every level to implement sustainable elements in it which will make it more effective in the end, than the industrial agriculture.

Also, the support of farming is very important in these countries. Because of the high number of population which they usually have there is a hunger as one of the biggest problem and many people die because of lack of food. Sustainable agriculture strategy and support for farming is very important and it can help in solving also this fundamental problem. Especially young people are crucial point in these new practices as the developing countries went recently through the population explosion and most of population is in the youthful age. So, the future of the country lies really in their hands, skills, knowledge, and will to practice farming in their life.

3   Results and Discussion

In this era of forward globalization there should be at least some basic knowledge about sustainable agriculture in less developed countries which must also meet the effort to support farming. In the next section we will choose Kenya as a country of global South where is a very significant need for this new insight and practices in the agriculture from the view of very high population which suffer for hunger. There is also a significant share of young people so there is also importance to support young farmers for their future work in this field. We will

therefore examine the concrete supporting mechanisms in sustainable agriculture which have been already realized in this country. On the other hand, we will examine the support mechanisms for young farmers which exist in this country mainly in the context of sustainable agriculture. Both will be examined from the side of governmental help and international development aid.

3.1   Support of sustainable agricultural practices in Kenya

Agricultural problems of Kenya like water erosion combined with the intensive usage of fertilizers have resulted in overall poor soil fertility. This has led to low crop productivity and farm yields. Farmers in Kenya are therefore often caught in a vicious cycle of decreasing soil fertility which necessitates the buying of expensive chemical fertilizer to improve crop yields, but which, in the long term will degrade their soil even more. Low crop yields directly result in lack of food and undernourishment for subsistent farming households (Ace Africa, 2017).

Agriculture plays a significant role in Kenya and its economy. More than 40% of Kenya´s population is employed in this field which is also more than 70% of the Kenya´s rural population (Childree, 2018). Any country can benefit from sustainable agriculture, but it is even more important that those with a heavy reliance on agriculture make sustainability a priority in their decision-making. Sustainable agriculture in Kenya can improve crop yields, stimulate the economy and help mitigate climate change. Kenya is very active in this issue and up to now it has implemented a lot of various programs focused on increasing sustainable agriculture practices. Sustainable agriculture in Kenya is making a positive impact on its economy and also decreasing the country's carbon footprint. This can be a notable example for the international community that economic and environmental interests do not always have to be against each other. When sustainable development is a priority, increasing economic success and decreasing negative impacts on the planet are possible to achieve simultaneously (Childree, 2018).

Unfortunately, the support from local and national government in Kenya was not very high in the beginnings. These political bodies supported unsustainable and expensive practices much more in past. Farmers in many Kenya´s districts lack information on appropriate and sustainable farming techniques to adapt to the challenges of climate change. In addition, many poor rural producers do not possess the knowledge and skills to access inputs, receive business support and seek market information. Inadequate support from the government to address these challenges created larger barriers for poor agricultural producers to enhance their livelihoods. But climate change's impact, various global problems and natural disasters in this country has driven many farmers to seek new planting techniques that maintain or increase crop production, despite fewer resources.

Therefore, the ecological group of farmers themselves started to spread the ecological and sustainable knowledge, skills and practices along the country. They found the support in other farmers and started to spread awareness. Gradually they have found support also in international organizations focused on the sustainable agricultural techniques and their enforcing in developing countries.

Important in all this process is therefore the international help and assistance. For example, there is a project *SALI – Sustainable Agriculture in Kenya*. It was implemented to deliver appropriate climate information to marginalized agricultural producers, community-based organizations and private sector agricultural producers in selected districts in order to increase incomes and opportunities and develop sustainable climate-resistant livelihoods (Abaha, 2014).

In this context another, project which is working to increase sustainable agriculture in this country, is the *World Bank's Sustainable Agriculture Land Management Project*. This project saw tremendous gains in the area of environmental conservation by training farmers in sustainable farming techniques (Childree, 2018). We can state the assumption that World Bank activities belong among the widest in this area. The Sustainable Agriculture Land Management Project has also helped small-holder farmers build smart agriculture skills. This has led to higher crop yields, increased income and food security, and resilience to a changing climate. The project has been implemented with support from the Swedish nongovernmental organization, Vi Agroforestry. As farmers learn new methods to revitalize their land – planting trees and crops, and harvesting in ways that produce natural nitrogen fertilizers in the soil and benefit the longevity of the land – they reap the benefits and share their experiences with their communities (The World Bank, 2015).

Ace Africa (registered charity in United Kingdom) is another organization from international arena which is trying to help this country. It has also been working to improve sustainable agriculture in Kenya by implementing with the so-called *Community Livelihood Programs*. These programs deal with the problem of decreased soil fertility by teaching local farmers how to make organic compost. This compost not only improves soil fertility, but also helps crops better fight against diseases and increases carbon sequestration (Childree, 2018). These sustainable farming techniques improve environmental quality and the ability of communities to utilize and live in harmony with the land for generations to come, and mitigating the effects of climate change (Ace Africa, 2017).

The International Maize and Wheat Improvement Center is another organization devoting itself to increasing sustainable agriculture in Kenya. One of the main techniques taught by this Center is intercropping (Childree, 2018).

Another very important and beneficial activities are done by the organization *SOFDI – Sustainable Organic Farming and Development Initiatives* – which main goal is to support sustainable agriculture initiatives in Kenya too. Using multiple approaches and taking the local context into account, they work with farmers, communities and schools in order to reach a large population. They operate only in Kenya, so they can optimally invest their resources, and avoid the high travelling and start-up costs associated with multiple operations. They involve also the county governments through a strong and positive collaboration, and work closely with research institutions and other like-minded organizations. This ensures actual information for farmers through their constant and intensive extension services and practical training programs. They have operated many projects focused on sustainable agriculture in this country (SOFDI, 2017).

Governmental help in this context has started to raise with adoption of Agenda 21 where government of Kenya has developed guidelines to integrate environmental concerns into agriculture development projects (United Nations, 1992). With adoption of Agenda 2030 for Sustainable Development the efforts needed to be much more active and effective. There was a pressure of international community, so the Kenya´s government declared in this Agenda that they will devote resources also to sustainable agriculture with common cooperation. They declared that they will adopt policies which increase sustainable development. Today in this country there have been adopted several policies for supporting agricultural sustainability. But the efforts are not enough to be successful. The international development aid is still needed.

An example of national support in this field can represent the school activities mainly at the universities. For example, Jomo Kenyatta University of Agriculture and Technology as a public university supported by government applies the sustainable and ecological agriculture practices very broadly. Over the whole university land there are many greenhouses and fields where students are learning about necessary ecological and other sustainable farming practices.

3.2 Young farmers support in Kenya in the context of sustainable agriculture

The farming sector in developing countries is generally not attractive also because the technologies that are used are not the most productive, there is no infrastructure, and there are land security issues. But farming is future for these countries as well as for Kenya where the situation is bad too. Some young people are settling for farming but not in big numbers. There is a big need for more people becoming farmers.

Also, in this area the support of international organizations as part of international development aid is very visible and the most important. Very active is, for example, an international organization *Farm Africa* working to build prosperous rural continent from Africa. This organization has been working with young Kenya´s farmers. According to a surveys and statistics, people under the age of 34 make up nearly 80 percent of the Kenyan population. There was a project named *Farm Africa's Youth Empowerment in Sustainable Agriculture* (2011-2015). It worked to build young people's interest in agricultural enterprises. This help generate income, create resilience and empower young people to become business leaders in their communities. Since 2011, another project *Farm Africa's Growing Futures* has supported 2,700 young farmers up to now in this country to make agri-businesses profitable. The project unlocks young farmers' potential to increase their yields and profits. In the next phase of the project organization wants to use the new funds to give high-quality seeds, and agricultural and business training to young adults to enable them to set up their own sustainable horticultural businesses. These projects have created, strengthened and supported youth groups to establish and manage agricultural businesses, have provided training and technical assistance in agronomy, have helped youth groups to market their products, and have encouraged youth to become active in local politics and governance (Farm Africa, 2018).

There are several most important reasons why it is important to support young farmers in Kenya, and those are following:

– The average age of a farmer in Kenya is about 61. It is one year more than the recommended retirement age of Kenyans. There is a need to cultivate new generation of Kenyan farmers, fill this gap and strengthen the Kenya´s economy.
– The average age of Kenya´s population is around 19 years and every year one million young people join the Kenyan workforce. There is a very high youth unemployment.
– Agriculture is the biggest Kenya´s industry and investing in agriculture is more effective than in any other sector at reducing poverty.
– In the future young farmers will be on the frontline of climate change. They will have to prepare for a changing, more volatile climate and they should already start.
– Economically empowering young farmers improves the health and wellbeing of the families they support.
– Young farmers bring fresh ideas and ambitions to farming, combining their entrepreneurial spirit with tailored farming. Business support can help to breathe life into fragile rural economies.

– No farmers means no food and no future. Helping young farmers make a success of agriculture is vital to feeding a growing population (Farm Africa, 2017).

In many places in Kenya there is poor access to water and low food production which put local communities at considerable risk. The effects of climate change and frequent drought are placing increasing pressure on farmland. Therefore, there is also a help from Philippines´ VSO volunteer Casimiro Bulilan who trains young farmers to more effectively cope with the potentially devastating effects of changing weather patterns as he is sure that helping young farmers in Kenya combat the effects of climate change. He is working in partnership with Illaramatak (community-based organization). Bulilan is sharing his skills and experience as a water engineer and conservation expert with young farmers in Kenya. His training has so far resulted in an encouraging change in the attitudes of the young farmers, and in an increased understanding of natural resource management as a means of combating the negative effects of climate change. The farmers are now able to actively apply their knowledge and practical skills of sustainable agriculture, that are very much needed to conserve and protect their farmland. VSO partner Illaramatak and volunteer Casimiro has continued to support the community by providing regular follow-up training and advices (VSO Jitolee, n.d.).

Other example of international development aid in supporting young farmers in the context of sustainable agriculture is the help provided by another non-governmental organization (this is from Slovakia) – *Človek v ohrození* (Human under the threat) which realizes its projects under the Slovak Official Development Aid. They have realized their help through various projects and besides other things they try to make agriculture attractive for young people. For example, they have established *School agricultural club* which was the common project of the organization Človek v ohrození with Kenyan organization NECOFA (Network of Ecofarming in Africa) and try to make the agriculture in its sustainable and ecological perspective more attractive for young people. Through various activities they present local youth with practical skills in the field of ecofarming, food processing, but also marketing and sales of products in nearby villages, towns and municipalities. Their main goal is to help small farmers and young farmers find employment in agribusiness so as to prevent them from migrating to cities. Through these activities young people realize that they can start farming, and they can have high yields, which can greatly improve their living standards. Many of them have changed their mind and instead of leaving for work in the city, they are interested in agribusiness now. Moreover, in this club they learn effective and environmentally friendly methods of crop production, animal husbandry, and various techniques of processing agricultural production. The added value is that

these young people then spread their knowledge in their families and also within their communities (Člověk v ohrození, 2015).

Also, in this issue there is a part of governmental help. Quite a new government document exists in this country and it is called „*Kenya youth agribusiness strategy 2017-2021*". Government see the problem of high youth unemployment (it is about 35 percent). The youth unemployment challenge is therefore primarily a challenge of economic growth and job creation in Kenya. It requires bold and coordinated efforts to stimulate economic transformation and business sector development (World Bank, 2014). Agriculture remains the backbone of Kenya's economy. It is therefore critical in creating employment and uplifting the living standards of the Kenyan people. Agriculture has been identified as one of the key sectors to deliver the 10 percent annual economic growth rate envisaged in the economic pillar of the Kenya Vision 2030. This growth should be achieved through transforming small-scale agriculture from subsistence to innovative, commercially oriented and modern agriculture (Ministry of Agriculture Livestock and Fisheries, 2017). Considering high rate of youth unemployment, the agricultural sector offers multiple livelihood and employment opportunities. The Ministry of Agriculture Livestock and Fisheries has developed the *Kenya Youth Agribusiness Strategy* to address challenges that hinder youth from participating effectively in this sector. The Strategy is aimed at providing new opportunities for youth in agriculture and its value chains. The impact of youth engagement in agriculture will be evident in sustainable economic growth, and in the reduction of poverty and hunger. The Ministry accents its commitment to create a conducive environment for the realization of the youth engagement in agricultural development initiatives. They want to support youth potential to contribute to the sector and indeed to the overall economic development (Ministry of Agriculture Livestock and Fisheries, 2017).

Youth offer a dynamic work force that is innovative; have a high uptake of technological know-how, and the ability to take on significant levels of risk. The Agriculture sector presents a huge opportunity for the creation of employment to absorb the youth and ensure achievement of food security for future generations. This issue has been a concern that has formed the development of youth in agriculture *Strategic Plan* (2017-2022) where eleven strategic objectives have been developed to address the challenges that hamper meaning and sustainable youth participation in agribusiness (Ministry of Agriculture Livestock and Fisheries, 2017).

4   Conclusion

At the conclusion we can summarize the findings of our research from Kenya as selected developing country directly endangered by unsustainable development, and struggling with several especially environmental and social global problems. This country has a constant population growth, but at the same time suffers on lack of food and sources which means that it suffers for hunger problem too. As it was mentioned, Kenya is not an industrial country and its future depends on the appropriate development of agriculture. However, because of the mentioned global problems Kenya must actively adopt sustainable agriculture strategy and techniques connected with it. At the same time there is a problem that agricultural sector is currently still little attractive in Kenya and Kenya´s farmers are getting older very fast. Young people which represent important part of Kenyan population are mostly not interested in farming and agricultural work. Because of this, there is a big need not only to support sustainable agriculture practices in Kenya, but also to make the agricultural sector sufficiently attractive for young people and provide an appropriate help for being a farmer there. The future of this country lies in the in success of these efforts.

According to the results of our examination and research made in this field we can state that the situation is getting on the successful way. We can see that there are a lot of foreign organizations which provides the international development aid in the field of support sustainable agriculture in Kenya very successfully and there are still more active efforts also from the government in this area. Of course, there is a need to make these efforts more active, and with an open space and will of national and municipal governments. Then also the international development aid will be even more successful.

In the field of support provided to young farmers in Kenya, where the average age of population is around 19 years (Worldometers, 2018) the efforts are also significant. Many foreign and also international organizations and individuals are trying to help young farmers in many ways to make farming more attractive for them. They help young people in practicing this job successfully in Kenya and these efforts are fruitful still more. The governmental help is visible here as well. Government see the huge gap which has been created in the sector of agriculture as well as the huge rate of youth unemployment. Also, for this reason it is still more active in creating documents and strategic plans to make this sector more attractive and accessible for young people in Kenya. Very important is the fact that all this support is focused on the agriculture in its sustainable context.

Kenya is on its right way to rich the high level of sustainable agricultural production and to change the environment of agriculture to be more attractive for

young (eco)farmers. It must continue in these activities and the global problems will be reduced in a significant extent. The same practices are needed to be supported also in other developing countries, as well as the developed ones. Everywhere the system of agricultural productivity must be changed to sustainable one and everywhere we can see the lack of interest of young people to work in agricultural sector also because of law support from governments. This situation needs to be changed for the purpose to make this world sustainable and in the way of reducing the global problem of hunger, poverty and the others.

Acknowledgements

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THE EXAMINATION OF RESOURCES AS BASIS FOR SMART DEVELOPMENT IN THE REGIONS ALONG THE HUNGARIAN-SLOVAKIAN BORDER

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Abstract

Paper's objective(s): *The aim of this paper is to summarize the smart development concepts from the professional literature available and to discover the resources that are the most commonly used as a basis for such development strategies. The target regions are along the Hungarian-Slovakian border, since they are the least-developed regions and at the moment they are very far from the existing smart development concepts.*

Data/Methods: *In this paper we intend to use desk research, we intend to give an overview on the smart development concepts in Europe including the target countries. In order to do this, we will do document and literature analysis. In addition, we intend to collect statistical data to see the current economic and social condition of the target areas and intend to find out whether these regions have the required resources to apply any type of smart development strategy.*

Results/Conclusions: *The results can be very useful from regional and rural development point of view especially for the policy makers, since smart concepts are getting more and more popularity all over Europe, but such disadvantaged areas are far from being ready for such concepts, resulting even higher territorial differences. It would be necessary to define the minimum requirements and alternative ways for smart village strategies so that the rural areas could catch up with the more developed regions.*

1   Introduction

According to UNCTAD (2004), 'globally, creative industries are estimated to account for more than 7 per cent of the world's gross domestic product and are forecast to grow, on average, by 10 per cent a year'. To create an environment in which people and businesses can succeed, a stable macro-economic environment is an essential condition. Upon that foundation we can create the conditions for supply side success: high levels of education for people of all ages, first-class transport and telecommunications infrastructure, a favourable regulatory and tax framework.

Nowadays there are two processes going on in the world and of course in the European Union: more and more people tend to move to urban areas searching for better quality of life, jobs, more and better services, greener environment etc. while there are more and more underdeveloped regions losing their attractiveness for investments, having poor infrastructure, having ageing and underqualified population, providing low-quality services in limited quantity (Káposzta & Némediné, 2017), thus getting gradually uninhabited. While in 2015, the urban population in the European Union was 72% of the total population, it is estimated that in 2050 this percentage will increase to 80%. On one hand, it can be considered a positive tendency and it establishes the emphasis on smart city concepts, on the other hand, it forecasts deep poverty and serious economic, social and environmental problems in the rural areas.

Since all the countries, including Hungary and Slovakia have to deal with these two processes parallel, apart from smart city concepts, smart village concepts must be also emphasized and tailored to the rural disadvantaged areas. In this paper we intended to see whether the regions along the border in Hungary and in Slovakia have similar resources and macro-indicators and whether they could be developed following similar integrated smart strategies. It is known that both countries have their own regional development strategies and national development plans, but in long terms harmonized strategies on both sides of the border could lead to sustainable economic and social development.

At the moment there are EU concepts for smart cities and smart villages existing, though the latter one is quite young. Smart Villages cannot be done in isolation and should be embedded in the wider development strategies for regions

and territories. Strengthening the links between rural and urban areas is key to achieving EU objectives. For many people, rural areas are simply home - a place to live, work and raise families. Rural communities need jobs, basic services, connectivity and smart transport solutions as well as a favourable climate for entrepreneurship. New types of business models need to emerge, such as portal-based services, and assist existing rural businesses to connect, integrate and cooperate better with urban based business. Location of economic activity is linked to the recognition of the 'geographical capital' and other possible comparative advantages for specialization or diversification. Intelligent logistics networks would allow villages to provide their products and services more efficiently on urban and global markets. EU rural areas are places of great assets and they can become even more attractive if local actors can unlock their potential.

Smart Villages cannot be done in isolation and should be embedded in the wider development strategies for regions and territories. Strengthening the links between rural and urban areas is key to achieving EU objectives. For many people, rural areas are simply home - a place to live, work and raise families. Rural communities need jobs, basic services, connectivity and smart transport solutions as well as a favourable climate for entrepreneurship. New types of business models need to emerge, such as portal-based services, and assist existing rural businesses to connect, integrate and cooperate better with urban based business. Location of economic activity is linked to the recognition of the 'geographical capital' and other possible comparative advantages for specialization or diversification. Intelligent logistics networks would allow villages to provide their products and services more efficiently on urban and global markets. EU rural areas are places of great assets and they can become even more attractive if local actors can unlock their potential. They provide indispensable contributions to solve many of the big societal challenges such as climate change or the sustainable provision of food, biomass and energy. Tourism and culture can stimulate employment and investment in rural areas. The most of this potential must be used and promote prosperity for the millions of rural citizens in the Union (https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/looking-ahead/rur-dev-small-villages_en.pdf).

Smart Villages is a relatively new concept within the realm of EU policy making. The emerging concept of Smart Villages refers to rural areas and communities which build on their existing strengths and assets as well as on developing new opportunities. In Smart Villages traditional and new networks and services are enhanced by means of digital, telecommunication technologies, innovations and the better use of knowledge, for the benefit of inhabitants and businesses. Digital technologies and innovations may support quality of life, higher standard

of living, public services for citizens, better use of resources, less impact on the environment, and new opportunities for rural value chains in terms of products and improved processes.

The concept of Smart Villages does not propose a one-size-fits-all solution. It is territorially sensitive, based on the needs and potentials of the respective territory and strategy-led, supported by new or existing territorial strategies. Technology is important as are investments in infrastructure, business development, human capital, capacity and community building. Good governance and citizens involvement is also key. A Smart Village would typically pay attention to e-literacy skills, access to e-health and other basic services, innovative solutions for environmental concerns, circular economy application to agricultural waste, promotion of local products supported by technology and ICT, implementing and taking full benefit of smart specialization agri-food projects, tourism and cultural activities, etc. The concept of Smart Villages covers human settlements in rural areas as well as the surrounding landscapes (https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/looking-ahead/rur-dev-small-villages_en.pdf).

2   Data and Methods

In order to see what are the economic and social conditions in the Hungarian and Slovakian regions, we collected macro-indicators for the years 2004 (the year of EU accession), the first year of multiannual programming periods (2007, 2013) as well as the most recent years (2015, 2016). We intended to see the tendencies in the most important economic, social, demographic, education and employment fields to find out whether these regions have the necessary resources for smart developments. The source of data is Eurostat. In the case of Hungary, we examined only Northern-Hungary (Észak-Magyarország), while in Slovakia we examined all the regions except for the capital region (Bratislava). To analyse and display the data we used Microsoft Excel program.

3   Results and Discussion

First of all, on Figure 1. we can see the change in population in the regions. It is important to mention that the size of the regions is not the same (regarding the population) but it should be clear how many people can be affected by the disadvantaged conditions along the border. As it can be seen on Figure 1, the greatest decrease in the population from 2004 by 2016 was in the Hungarian region (over 126.000 people) due to its handicapped economic and social situation (it will be proven by further tendencies).

Figure 1 **The change in the population of the regions in number (2004-2016)**
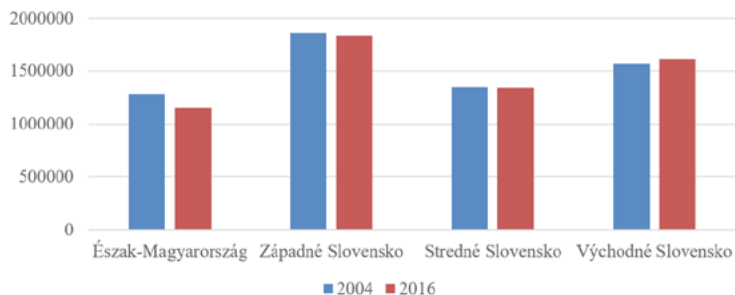
Source: Eurostat, authors' own calculations, 2017.

Figure 2 **The share of population between 25-64 years (%, 2004-2016)**
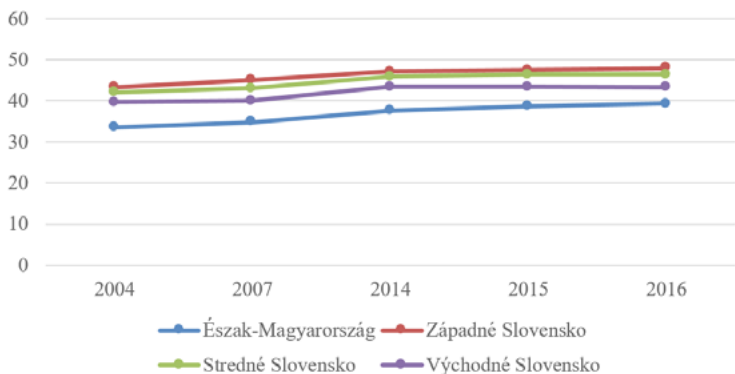
Source: Eurostat, authors' own calculations, 2017.

Figure 2 also refers to the disadvantaged situation of Észak-Magyarország, since it has the lowest share of active population within the total population. It makes it more difficult to carry out developments that contribute to the GDP growth, because only a low percentage of the population can be the basis for such. The picture is even more disappointing for the policy-makers, if we take the elderly people (over 65 years) into consideration who are officially retired and not economically active any more. In general, the tendency is gradually increasing but in Észak-Magyarország it nearly reached 19%. It means that one in five is 65 or older and based on the social net. The most favourable conditions are in Východné Slovensko.

Figure 3 **The share of population with 65 years and over (%, 2004-2016)**
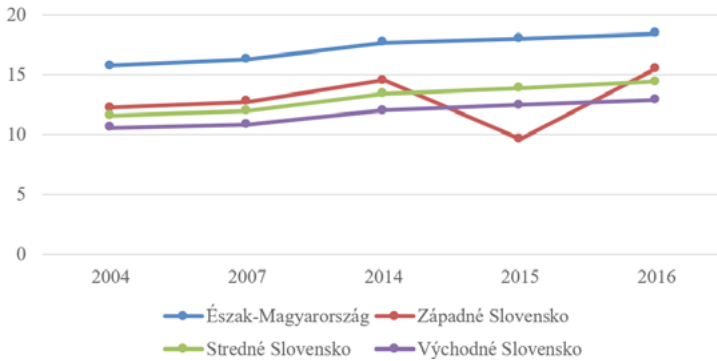
Source: Eurostat, authors' own calculations, 2017.

On Figure 4 the PPS per inhabitant is shown in the % of the EU average. It is important to see because it can reflect the economic power of a region and can be attractive for people thus encouraging them to move to the region.

Figure 4 **Purchasing Power Standards per inhabitant in the % of EU average (2004-2015)**

Source: Eurostat, authors' own calculations, 2017.

Regarding the employment rate in the regions, we can see gradual increase in all the regions, however, only Západné Slovensko and Stredné Slovensko reach 70%. Going back to the smart concepts, it is not enough to see the employment rate but it is more important to see how many people work in jobs related to high tech or research and development fields. On Figure 5 we can see that the share

of R&D personnel and researchers (% of total employment). Two different tendencies can be observed. One is in Észak-Magyarország, where it is a decreasing tendency and the other is in Stredné Slovensko, where a significant increase could be realized.

Figure 5 **The share of R&D personnel and researchers (% of total employment, 2004-2015)**
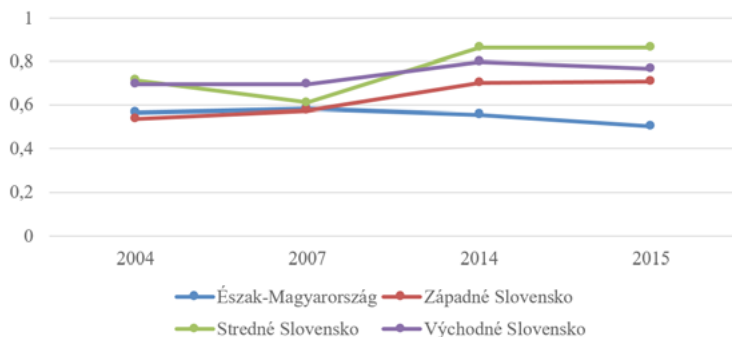
Source: Eurostat, authors' own calculations, 2017.

Moreover, we need to see the R&D expenditures whether they could provide basis for smart developments. On Figure 6 the abovementioned expenditure is displayed per inhabitant. The picture is quite disappointing for us as Hungarians, since we can see that our region has been lagging behind over the last 10 years, while the Slovakian regions showed spectacular increase in such amounts. The highest figure was over 133 EUR/inhabitant in Strendé Slovensko in 2016. However, it is very promising that the change from 2004 by 2015 was very significant in general.

Figure 6 **Intramural R&D expenditure (GERD) by sectors of performance and NUTS 2 regions (EUR/inhabitant, 2004-2015)**
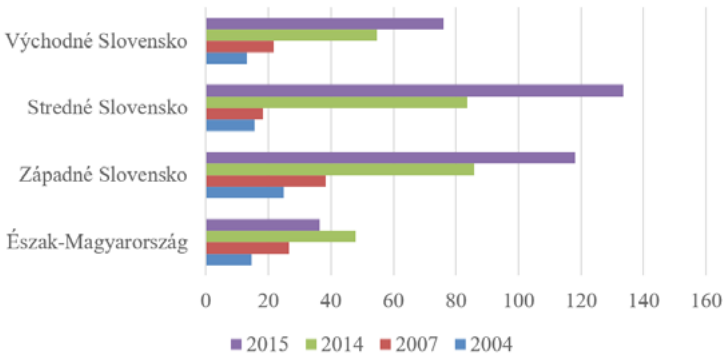
Source: Eurostat, authors' own calculations, 2017.

Based on the abovementioned we can state that there is still a lot to do for the governments and the entreprises when it comes to invest in R+D+I but their moderate activity can be understood if we consider the education level of the population. On Figure 7 and 8 we highlight the fact what share of the population has low or no education level or attained tertiary education. Both groups are important from the smart concept point of view, since people with very low education are not able to use the smart technologies even if they are planned so, and the latter group could be the solid basis for sustainable economic development. Unfortunately, Észak-Magyarország is in the poorest position in both regards. On Figure 7 it can be seen that all the regions developed their positions over the years but the Slovak regions did better, reaching or almost reaching 20%.

Figure 7 **The share of population with tertiary education (% of population between 25-64 years, 2004-2016)**
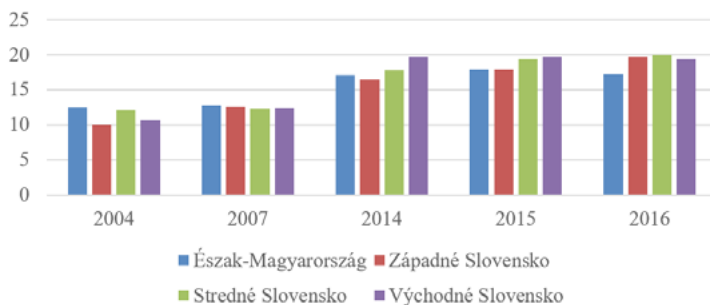
Source: Eurostat, authors' own calculations, 2017.

From smart city and smart village development aspects the abovementioned figures are very important, but as a challenge/problem, the high rate of people with poor or no education is far more important. To educate such people pose a huge burden on the economy and the society and needs those people's willingness as well – which is often an obstacle.

Figure 8 **Less than primary, primary or lower secondary education (% of population between 25-64 years, 2004-2016)**
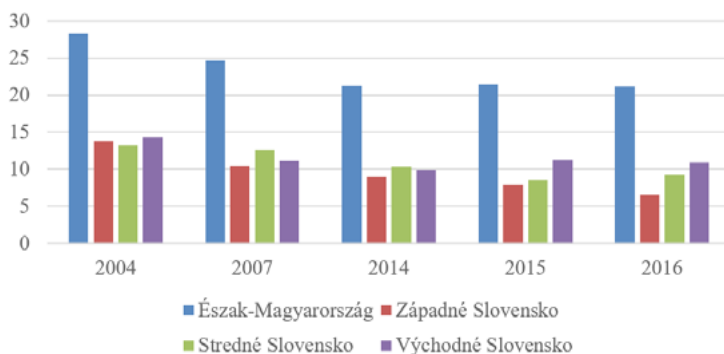
Source: Eurostat, authors' own calculations, 2017.

Figure 8 shows that in Észak-Magyarország – despite of the decreasing tendency – the rate is still high, around 20%, which is about double of the figure of the other regions. It is obvious that in order to decrease this rate significantly not the high cost is the most challenging but the attitude and family background

of people. Even if there are development funds available to educate people, it is not able to solve the problem, not to mention the time-demand of a significant improvement.

Figure 9 **The share of those who have never used computer (% of population, 2007-2015)**
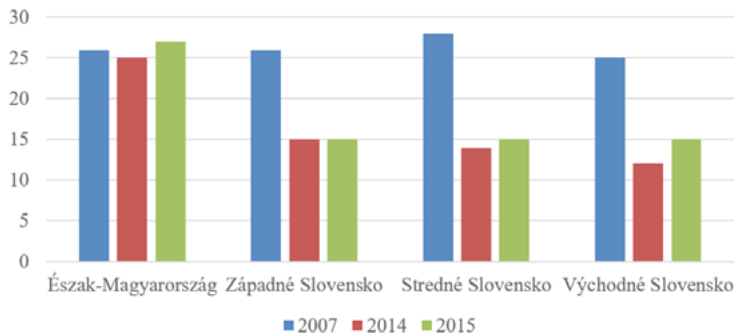
Source: Eurostat, authors' own calculations, 2017.

Figure 9 shows only the data for years 2007, 2014 and 2015 because for other years statistics are not available in Eurostat. We need to take these figures into consideration when making efforts to adopt smart strategies in these regions, because the current strategies intend to build on developed ICT and the relevant knowledge and skills of the human resource. However, from these data we should see that there are serious obstacles in Észak-Magyarország, where over 25% of the population has never used computer, so their computer skills need to be developed as a first step. The current strategies take these skills as an already existing condition, so they want to focus on their advanced developments and not on their creation from the beginning. This fact clearly shows that the present smart strategies have to be modified and adapted to the disadvantaged rural conditions.

4   Conclusion

The abovementioned proves that there is a strong need for smart concept specifications for rural areas in the Central-European region. In our research we intended to call the attention to the fact that smart development strategies could be applied in the rural development, but in their present form they are not suitable to achieve the expected results. In our paper we chose the Hungarian-Slovakian border regions as target area, but of course to draw complex conclusions, other regions are recommended to be involved in the research. We have already started

this work and wish to collect those conditions and resources that are needed to carry our smart strategies and achieve economic and social development in the regions lagging behind. Urban areas are in more favourable situation, since they have qualified human resource that can be a good basis for smart technologies, but the problem can be observed in the rural areas where there is no required human resource who could be the end-users of smart technologies. It is known that investing in technologies is not the most challenging in such developments, since if there are development funds available, technologies can be easily bought. The problem seems to be rather with the human capacities which should be developed and it can only be carries out in long terms. At the moment, the gap is so huge between the regions in this regard that very tailored and specialized strategies are needed in each case.

Acknowledgements

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SELECTED INNOVATIVE CASE STUDIES OF SHORT FOOD SUPPLY CHAIN IN EUROPEAN COUNTIES, WITH APPLICATION TO SLOVAK MARKET

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Abstract

Throughout the European Union, local producers have a significant role, which is increasingly becoming more aware of consumers, and their products are increasingly demanding. This trend can be seen especially in more developed Western European countries. The current situation in Slovakia in the area of production and processing of local products is that retail chains offer low sales prices to producers, which compensate for the quantity of product. In this situation, there is a problem where this business relationship with the local producer is for only cover the costs with minimum profit for producers. We assume that the current situation will be local farmers to seek new opportunities to sell products. The short food supply chain is one of the alternatives of the long-globalized food chain. Sale of local products that producers distribute as soon as possible in full quality, freshness, and signs of local origin are the future sale of local products with value added. The aim of the paper is to review of the literature and best-case studies selected from the European Union countries in which the developed food distribution system for short food supply chain has been established. To achieve the main goal, we use comparative methods to compare case studies in different countries and also the deductive methods based on which we

deduce conclusions. Based on the review of scientific papers evaluate application and success of short food supply chain in the Slovak market. In conclusion, identify the possibilities of applying these successful cases to the local producers in Slovak market.

Keywords: *local products, short food supply chain, local farmers, value added, European Union*

JEL classification: *R11*

1   Introduction

Recently, the term "local product" is increasingly mentioned in general and research literature. Problems with the quality of imported products, patterns and inequalities in the quality of Western and Eastern European products force customers to be more interested in, where the product comes from and what it contains. Purchase of local product is one of the ways to ensure the origin and contents of products. At present, "retail chains", a local farmer has difficult conditions and is hard to keep on the market, as retail chains set conditions that are not acceptable to small farmers. One of the most effective alternatives to sell products from the region to customer table is short food supply chain. Strategy of selling products is not only economically efficient, but also ecological and has a positive effect on building communities, improving the customer relationship between customer and farmer, improving the health status of the population and improving the quality and freshness of food. The food chains are more complicated than others, because local products are more perishable, and that's another reason why short food supply chains are a good alternative system to selling local products. The EU has many successful local farms and businesses that distribute products using short food supply chains and build a community of people and standard of living in the region. The better understanding of different methods and identify factors of success selling local products in other EU countries leads to the possibility of applying to the Slovak market.

2   Literature review

Increased globalization along with a growing world population have a vast influence on the sustainability of supply chains, mainly within the food sector. The way food is actually produced, processed, carried, and consumed has massive impact on whether sustainability is actually realized throughout the whole food supply chain (Govindan,2018). All supply chain concepts are trying to be more

efficiently in all the processes involved. It is most important to ensure and capable supply chains in food systems from scale, such as macroeconomic levels such as environmental, economic and social to micro level, such as individual farmers or individual consumers. One of the main factors for this improvement is the increase and growth of the world's population. The world population has improved from 2.53 billion in 1950 to around 7.6 billion in 2018, as well as the prediction show a population growth of 9.6 billion after 2050 (www.ourworldindata.com, 2018). More and more important emphasis will be placed on all activities which ensure the saturation of folks, beginning with farmer work productivity, cereal production, and efficiency of distribution channels. All the activities that allow the flow of food from farm to fork is considered as the food supply chain (FSC) (Bourlakis & Weightman, 2004; Dani, 2015). Over the past years, food-related supply chains have been completely industrialized on a worldwide scale and re-shaped exactly how food is actually produced, accessed as well as consumed. With a concentration positioned on economic efficiency, foods producers have systematically struggled to run despite lower financial returns although, at exactly the same time, implementing heavy pressure on ecosystems to satisfy the need for low priced food (Pretty, 2001). The Food supply chain will have to conform the way food is actually produced, stored, handled, distributed, and also accessed to meet the challenges that it's faced with. In past times, all of these processes occurred locally in a small location. Such a FSC isn't sustainable and can't deal with the demand of the whole world population. Thus, the FSC is transformed into a global FSC in which all or some parts of distribution processes, process, storage, or the production will be performed in multiple areas world (Gharehgozli, 2017). The fact is that each year over 200 billion metric a ton of foods are actually shipped 60 % by sea, 35 % by land, along 5 % by air around the world (Ackerley, Sertkaya, Lange, 2010; Bendickson, 2007). The increased shipment of foods in quantity and distance is actually linked with logistics risks caused primarily by low logistics technology and ineffective logistics management. These risks causing major damage to the agricultural sector, because they lead to a loss of food, food contamination, spread of diseases (animals and humans) and environmental damage (Bosona, 2013), today food is not grow and produce directly for feed customers, but for travel to customer . Food must endure long transportation and still remain fresh for the customer. Not all foods are able to grow or produce in the region, but if the country has the conditions to produce products that are high quality, safe and able to satisfy demand, it should use them and feeding their inhabitants. The conditions for the production or cultivation of certain foods are demanding and there must therefore be a long-range distribution, but why import food that can be produced in a given region. The set of activities that includes the entire processes

is called agri-food supply chains. The term agri-food supply chains (ASC) has been developed to describe the activity of production to distribution, that provide agricultural or horticultural commodity (Aramyan et al., 2006) from the farm to the plate. ASC form organizations responsible for production (farmers), processing, distribution and marketing of agricultural commodity to consumers. The supply chain of agri-foods, as any other supply chain, is a system of organizations collaborate in different processes and activities to bring products and services to market to meet customer satisfaction and demands. (Christopher, 2005). ASC is completely different from other supply chains, the importance of factors such as quality and food safety and variability related to weather (Salin, 1998). Other relevant features of agro-food products include their limited durability, demand and price variability, making it more difficult to manage than other supply chains. New prescription global research agri-food systems, dominated by vertically integrated large private enterprises, undoubtedly contributed to achieving higher food production and productivity levels within the food supply chain. However, this success has led to several negative economic, environmental and social externalities that have led to increased marginalization, huge contrast and vulnerability of small family farms (Cleveland, 2014). Farms that are declining in profitability, price depression of commodity production (Canning, 2014) and many developed economies, can shipping, processing, and marketing activities charge up to 80% of the food costs paid to consumers.This indicates that the common farmer now receives just 20 % of the retail food price (Feher, 2012). An alternative to long globalized food chain are short food supply chains (SFSCs), originally created by Marsden (2000), was created to address these societal discomposure. Mikro scale business concepts throughout the world are becoming trendy among consumers and their increasing interest (Migliore et al., 2015). SFSCs allow consumers to evaluate the real value of the food product (Kneafsey et al., 2013). This means that products are embedded with information that allows consumers to understand how and where food is produced, so that creating a stronger confidence between consumers and producers. In other words, the supply chain makes it easier to build confidence through close relationships between producers and consumers by removing intermediaries (processor, distributor, wholesale) and allowing direct relationships. Despite the fact that the vast majority of consumers come to supermarkets due to weekly grocery shopping, the growing number of people are increasingly aware of their role in managing changes in the food sector (Lockie 2009). They are known as "citizens consumers" and promote ethical and environmental focus on food production (Wilkins 2005). Consumers are increasingly demanding food that is safer, healthier, safer, tastier and more environmentally friendly or more natural friendly (Krasnodębski, Cieślik, 2001;

Matysek, Zafrański 2009; Gao et. al. 2010). In this sense SFSCs as an alternative food market, which minimizes intermediaries between producers and consumers (Rentals., 2003) and offer products that embed localization of economies and social welfare (Marsden et al.2000). SFSC concept appeared at the turn of the century in the context of a broader discussion on "Alternative food chains" (Liberia et. al., 2005), which is an important part of ASC. SFSCs are analyzed and translated as a method to greatly improve the resilience of family farms along with the support of relevant consumers, local communities as well as civil society organizations. SFSC is increasingly devoted to the consideration of European food and rural policies as a driver of agri-food systems and rural development (Galli et. al. 2013). In Rural Development Programmes 2014-2020 the European Commission integrated short supply chains in its regulation. According to article 2 "m" of the Regulation (EU) No. 1305/2013"short supply chain means a supply chain involving a limited number of economic operators, committed to co-operation, local economic development, and close geographical and social relations between producers, processors and consumers".

There are many different examples of SFSCs. Some will be described in the second part of this article. Examples include the following:

- *farmers directly to consumers*: farmers market, village market, food delivery, direct sales, pick products in collection point/store, farm store, scheme boxes, road-side, selecting pick your own, CSA farm
- *indirectly*: Farmers local store, restaurants purchasing products from farmers, online sales, community cooperatives, consumers cooperatives (Maciejczak, 2014).

A study of Roman (2017) found that for most consumers in developed countries it is very essential for food to be natural. They choose foods that are grown, produced and processed in a traditional way and in harmony with nature. Further research from Roy (2017) shows that restaurants, chefs and buyers are more confidence in local products, but also plays a major role in how you build a relationship between farmers and consumers in the local market chains. Face to face relationship is the most efficient concept. Central European consumer behavior survey showed that Czechia, Slovakia and Poland are countries whose price is one of the main factors in the purchase of goods, but for milk products, meat products, fruit and vegetables prefer quality (Horská, 2011). Research literature has extensively discussed the potential importance of local products and impact of SFSCs. By combining local food distribution and Rural development, SFSC is an effective alternative to the other supply chains that can achieve sustainability in agri-sector. A significant share in the creation of a rural economy has agriculture,

which is being created mainly out of cities (Rovny, Nagyova 2007). Taking into account that 44 percent of the world's population living in rural areas and proportion of developing countries is even higher, which is 55 percent. At European level, the Commission for Agriculture and Rural Development considers that rural areas report for 85 percent of the total area and affects directly or indirectly more than 50 percent of the European population (Sin, & Nowak, 2014).

3 Methodology

The main aim of the first part of our discussion paper are better understanding how SFSCs are important and identifying opportunities for improvement that can help to be successful on Slovak local market. Achieve this aim we beginning with research of literature some background about the better understand how the SFSCs works and which major impact have on the environment, human health, consumer needs and population growth. Literature reviews are designed to provide an overview of sources (Fink, 2005), and we used a more research to clarify important role of SFCs in food supply chains. However, the literature is complete and it is clear that there is a need to understand how it works (Handfield and Melnyk 1998) and case studies are a useful tool to study and develop theory (Halinen, 1998). Our research will discuss the challenges facing collaborative SFCs in European countries and their access to markets, logistics and distribution. To construct a representative database of existing local food schemes in the EU falling in different categories: e.g. e-shop, pick products in store, Labelling scheme, farmers market, open air markets, collective farmer shops, Farmer store, on- line sales, direct selling, Direct sales, automatic machines, B2B, Farm store, delivery sales, e-shop, selling directly to restaurants, pick products in collection point/store, boxes scheme. Conduct detailed case studies to generate more precise, quantitative data in regard to the impact of schemes in local food for a determined area or products. Five detailed case studies were preferred reflecting different categories of SFSC, as well as geographical diversification in the EU - 27. While all of this research is valuable, coherent set of best practices cases in short food supply chain across several European countries. In the present paper, we identifying and analyzing case studies of 5 best practice cases selling product through SFSCs. For better analysis, we selected companies with a longer tradition as well as new companies. In the second part discussion, our main aim is to identifying coherent and testable opportunities, which are possible adapt in Slovak food market. The plan to achieve the main goal, we first analyze the best cases from all over Europe, that have available information. We obtained the information from the websites of selected businesses or from documents and research established by the European

Community and European Commission. We use comparative methods to compare case studies in different countries and also the deductive methods based on which we deduce conclusion. In conclusion, we identify factors of success, and also barriers. It makes proposals for further research of Slovak farmers, if they are willing to accept this alternative supply chain.

4   Discussion

The literature review showed that Short food supply chains are still developing as well as EU mentioned in Rural Development Programmes 2014-2020 the European Commission integrated short supply chains in its regulation. Very few papers compare cases of different types of SFSCs across several regions. It appears that authors use various approaches to identify cases which they go on to use in their papers: Online searches, knowledge due to prior research, personal familiarity with region. In present papers we use online searching and research of project founded by European Commission. In our research, we identified more than 20 best case studies across the EU member states but was difficult to choose some to analyze. We have chosen 5 best examples (Table 1) by following principal attentions: Slovak market doesn't use efficiently particular scheme or method, outstanding and innovative, service with value-added, active user of the online communication and service performed within the region.

Table 1 **Quick referent guide**

Country	Name	Type of SFSCs	Products	Branding
Austria	Speisle Lokal	e-shop, pick products in store	Fruits and vegetables, eggs, cheese, meat, bread, pasta, fruit juices, cereals, herbs, oil and vinegar, honey and jams, biscuits and cakes, chutney, beer and wine	Logo created
France	La Marches des Producteus de Pays	Labelling scheme, farmers market, open air markets, collective farmer shops	Only organic food from local farmers	Strong branding based on history and quality of markets

Country	Name	Type of SFSCs	Products	Branding
Poland	Paczka od rolnika	Farmer store, on-line sales, direct selling	Vegetables and fruits, eggs, dairy products, cereals, juice, herbs, others	Creative design, effective online marketing
Belgium	WDM Boerderijautomaten	Direct sales, automatic machines, B2B	All kind of products	-
Germany	Ökodorf Brodowin	Farm store, delivery sales, e-shop, selling directly to restaurants, pick products in collection point/ store, boxes scheme	Cow milk, goat milk, chesses, butter, cottage cheese, oil, honey, meat and product with value added	Valuable merchandising, web design, social media communication, digital marketing

Source: Own processing based on Speislelokal!.org, Reseaurural.fr, odrolnika.pl, automaten.wdmnv.be, brodowin.de, 2018.

1. Speisle Lokal (Austria)

Community Supported Retailing

SpeiseLokal started as a consumer-oriented initiative in cooperation with a female organic farmer. SpeiseLokal was originally considered to be a platform that brings together people who are interested in local food, providing information on local and global food systems and on various aspects of food, nutrition or horticulture. It is curious that most farmers in the region have agreed to deliver their products through this platform. Speiselokal! sells products what farmers have chosen to offer each week. Therefore, only local and seasonal products are sold. The products must come from small farms, seasonally and ecologically/produce as close as possible, with very few exceptions (beer, butter) no more than 80 km (Galli et. al., 2013). Speiselokal! it still serves as a platform that connects people and initiatives. Every month, it organizes trips to farmers who deliver. Organizes, coordinates and supports kitchen workshops, lectures, seminars, celebrations and other food events. It provides information on the (sustainable) production, distribution and consumption of food, and helps people share their ideas, recipes, initiatives. A customer can order products through a web store, post office, phone at the specified time. If you need goods every week, you can enter a permanent

order and the products will be automatically prepared. Products are delivering each week at the same time in the shop, where customers can get the order. It is also ecological because customer can bring own package. Products that have a longer service life are still available in shops, beverages, cereals and seeds. The order planning and packaging system saves the environment because the Speise-Lokal! avoid overproducts and food waste from products.

Innovation: SpeiseLokal prepares weekly meals that you can enjoy during picking orders. Recipes are publishing on the website, if the customers are interested in the SpeiseLocal, they can make an order of this food e.g. soups, salads and cakes (Speiselokal !, 2018).

2. La Marches des Producteus de Pays (France)

Farmer market platform

It is the national labeling system developed by the Permanent Representation of French Chambers of Agriculture (APCA). This system provides accurate rules manufacturers may use labels. The labels proof that products are produced and processed by identifiable farmers who use a defined proportion of components from a designated farm. Farms must adhere to strict rules on the origin and transformation of products, marketing and labeling and the conditions and requirements to host on the farm (at least once a year). The farmer has to pay an annual fee for securing the label, but in return, he gets the training and advertising required for the farm. The MPP is a trademark owned by APCA. The aim is to develop local economies by building relations between farmers and consumers in the same region, to valorize agricultural products and farmers knowledge and to protect rural development. The MPP Charter is a guarantee to consumers that the products they buy come from the exact farms. MPP is the marketplace, where only producers from the province and neighbors are. Markets can be organized by local Chambre d'Agriculture or other local authorities. Approval of a market organization must be approved and renewed annually. It can be a year round market, seasonal, or even one day. The MPP mark must be promoted by all producers on the market. The producer fee is included in the APCA annual fee, but for other farmers, the fee is required because Chambers provides advertisements for them.

Innovation: La Marches des Producteus de Pays has created such a strong brand, that if you are a community, a tourism organization or a producer and want to organize an event within a region, you can rent the MPP brand.

3. Paczka od rolnika (Poland)

Delivery direct sales

This project is realize only by farmers who sell their own products under the "Odrolnik" brand and in the form of "Farmers' packages", which consists in the fact that all producers sell directly, and the association of ODRLNIKA GROUP and the Environmental Education Foundation serves as co-ordinator at the same time dealing with the development of the project and the promotion of the idea of direct sales.

Project Green Office

Collaboration with a Green Office certificate company where they are involved in each weekly or two-week delivery of organic food packages for employees of the office. They are trying to achieve a collective amount of at least 50 orders per week with an average order value of PLN 100.00 delivered to one address/office. Its implementation can contribute to savings by rational resource management and increase environmental awareness of employees. With the implementation of Green Office's green office, companies often choose to train their employees. It is not only about purchasing local products but also about training to introduce the issue of green office between employees. In practice, best practice in the day-to-day operation of the company is knowingly using water, energy or paper for office purposes.

Innovation: Created groups with a subscription in a given location. If the locals who are interested in local products create a group that will be followed by the coordinator and establish a point where according to the specified conditions, the customer will pick up their order of local, fresh products. Products are imported on a weekly or two-week basis. Expanding the community that are interesting for fresh, local products creates space for creating a new community (odrolnika..pl, 2018).

4. WDM Boerderijautomaten (Belgium)

Automatic food machines

This company represents a combination of automation, new technology and the agricultural industry. The company is a specialist in vending machines with suggestions and options are active for each type of agricultural product, frozen, chilled or not chilled. These vending machines are able to sell bread, drinks, fruit eggs and vegetables. The owners of the company directly meet with producers and processors of agricultural products and explain to them how the system of automatic food machines works. This model has proven to them, and there is a growing demand for both the automat and the products that are placed there.

The company offers a number of differentiations such as potato mash (potato sale), freezomat (sale of frozen and cooled products) this products from this vending machine are more expensive because the machine has to work with cooling. These vending machines can be personalized to the farmer's request: cell size, slot size and design, and other specifications. In the fruit and vegetable sector, it is mainly about product preservation. The consumer wants to see what product, how looks like, which size will be the best for him etc.. For better presentation, they use plexiglass and LED light to enable the perfect appearance of the products. Also important is the packaging of products where, in most cases, farmers used paper bags, when products are selling in vending machines, the packaging of this products must be visible.

Innovation: The company is able to sell and store meat and meat products in automated machines that have refrigeration equipment. It is able keep the meat in the cell at the right temperature or freeze to ensure the freshness and durability of the products in the cells. Such a short food supply chain is one of the best solutions to link automation and sales to regional products (automaten.wdmnv. be, 2018).

5. Ökodorf Brodowin (Germany)

Farm store, box scheme with delivery service
This Dairy farm produce milk products like Mozzarella or Yogurt, a butchery for their own sausages, ham and other meat products and a store to sell all their goods. Furthermore, a cafe and a catering service. The agricultural products like wheat, potatoes and vegetables are used for feeding the cattle, the dairy cows, goats, sheep, chickens etc.. But also are sold to customers in the farm store.

Farm store - dairy store: Every day we process dairy products from fresh milk. We sell directly in our farmer's innovative farm shop. Specialty is that through the large glass facades we can watch and see how we produce, for example, and mozzarella cheese. Architecturally, the building combines state-of-the-art technology and architecture.

Online delivery service: A nicely modified web through which they sell a wide range of local organic products. On orders have created delivery service that is personalized, so each area is responsible for a specific person. This is the place to create closer customer relationships.

Innovation: The Brodowin Boxing scheme has a great added value. Through the online shop, the customer can order a box of local foods selected for a precise recipe or an opportunity for breakfast, lunch, vegetarian, vegan, baking, sweet, salty. The box is exactly the weight of the food for a certain number of people

the customer chooses. The given recipe is specifically delineated under the order (brodowin.de, 2018).

5   Conclusion

As a conclusion from the analysis of literature review and the cases we can see that further growth of SFSC enterprises has big potential. Economic potential SFSCs at the present state influence Slovak retail chains in the food chain is of great importance because farmers are in a weak bargaining positions. Taking into account that nowadays food for people subject to large distances and affect the quality and freshness of the products, other fact is that in rural areas lives 22.3% of the EU-27 population. Eurostat data indicate that 51.3 % of the EU's land area is within regions classified as being predominantly rural. Slovakia is a country with diverse countryside and therefore there is a high potential for application of the potential application of effective strategies by SFSC. Slovak customers prefer low prices when buying, but products such as meat, dairy products and vegetables are also aware of the quality and local products are increasingly popular. If an effective scheme is created, the local product sales model may cause a surge in local producers in Slovakia who will start selling their products directly to customers, making them more economical for them. The analysis showed that co-operation not only with farmers but also partnership cooperation and institution support is necessary. Creating a community of customers who are interested in quality and fresh products will achieve greater awareness of these products. We see the great potential of the analyzed cases in their interconnections. Create a community using the delivery service and picking up products at collection point/store, effective online marketing and online presentation of products, farmers or host guests directly on the farms also it leads to better customer relationship with those who purchase local products in the region. We see the potential to apply direct contact between the farmer and the customer through a single structured organized event under one brand, which can also be organized in cooperation with other rural development institutions. Increase the availability and popularity of these products through SFSCs such as delivery services that deliver products to the doors, each area being addressed by a particular person who has the potential to shape the necessary personal relationship with the customer. We recommend further research on the Slovak market, to analyze the possibilities of creating an efficient, institutional and community-supported model of short food chains.

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FARMERS' OPINION ABOUT THE POTENTIAL TO PURSUE NON-FARMING OCCUPATION OPPORTUNITIES

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Abstract

Agriculture in Poland and the Polish farmers are confronted with numerous problems, mainly of the financial nature. Not surprisingly, they seek to change this difficult position and improve their economic situation by looking for alternative sources of income. As consequence, the existing model of countryside is evaluating to encompass new functions. The aim of this research was to examine several options available to farmers, who can either expand their existing activity, or venture into the new territory and start non-farming occupation. The diagnostic poll method combined with the questionnaire technique was chosen in order to gather the empirical data for the study. The research was conducted between 2014 and 2017 on the group of 155 respondents. The study proved that they were aware of the possibility to undertake non-farming occupation. The farmers who took part in the poll realized the potential to expand their activities in order to encompass new forms of generating additional income. They pointed at numerous advantages and factors, which inclined them to undertake such a challenge, however they were also well aware of numerous disadvantages and obstacles the new undertaking might involve.

Keywords: *agriculture, rural areas, multifunctional development, sustainable development, non-agricultural entrepreneurship*

JEL classification: *Q10, Q16*

1   Introduction

Agriculture in Poland and the Polish farmers are confronted with numerous problems, mainly of the financial nature. This is a consequence of insignificant size and considerable spread of farms in Poland (Mickiewicz & Mickiewicz, 2014; Pawlak, 2001), which translates into low volume of production making it either unfeasible or not viable at all. Without a doubt, the problem is complex and solving it requires time. The situation becomes even more complicated when one takes into account the strong bonds that farmers have with their land. It is because of these bonds that they are reluctant to sell the land or its parts. For the reasons mentioned above, searching for alternative sources of income may improve the meagre economic situation of some farms. Naturally, such development will result in multi-functional development of farms, and skilful incorporation of the new, previously unknown functions by the countryside (Runowski & Ziętara, 2011; Kalinowski, 2013; Prus, 2010, p. 15-16; Roman, 2014; van der Ploeg & Roep, 2003). However, this task will not be possible without the change in farmers' attitudes. They must realize that by undertaking other, non-farming occupations (Carter, 1998) they may be able to improve their standard of living. They need to become aware that apart from the income generated by their existing farming job, they have a potential to include the profits generated by hired, seasonal or part-time workers (Blinova & Vyalshina, 2017; Kalinowski, 2015; North & Smallbone, 1996). Having an extra source of income usually results significant benefits such as the improvement of farmers' standard of life, and expanding of the scope and the type of their production. In certain cases the additional non-farming occupation may become predominant, and replace previous farming operations, especially when the two are not related (Wojewodzic, 2017).

Undoubtedly, alternative non-farming types of occupation have numerous advantages. Firstly, they help to alleviate social tensions in rural communities (Kowalska & Niedziółka, 2016) and, in the long run, help to revive the economy of rural areas by boosting the development of local businesses (Marcysiak & Prus, 2017; Reardon et al., 2007). Secondly, labour migrating from farming to non-farming jobs is beneficial for the economy of the whole country as it absorbs the surplus of employees who, due to unfavourable conditions, cannot be employed in other jobs (Roman & Roszkowska-Mądra, 2015). The aim of the research was to determine if farmers have the potential to pursue non-farming employment or if they can expand the scope of the existing production. To sum up, the author wanted to determine if the farmers were aware of this potential, if they wanted to pursue it, and finally which types of occupation they were particularly interested in.

2 Data and Methods

Rather than using a random group, the author pre-selected the respondents. In order to gather the empirical data, there was conducted a poll between 2014 and 2017 among 155 students of Master Agriculture studies, who were either land owners or lived on farms managed by their parents, and were going to succeed them in the near future. Different studies usually adopt the level of formal education as the universal measure of one's skills and professional knowledge (van den Ban & Hawkins, 1996; Zawisza & Pilarska, 2005; Kalinowski, 2011). This and other important criteria, such as having access to different sources of information or relying on professional advisory centres (Prus & Drzazdzynska, 2017) help farmers, who often encounter obstacles while organizing and managing their farms, overcome these barriers. They also increase entrepreneurship among farmers and other countryside dwellers, which has beneficial impact on the development of rural areas as a whole (Kielbasa, 2016). It can be safely assumed that the participants of the study will soon exert considerable impact on the shape of agriculture locally. Therefore, according to the Diffusion of Innovations Theory (Rogers, 1995; van den Ban & Hawkins, 1996; Zawisza & Pilarska, 2005), they are bound to become the potential future innovators and opinion leaders, who will be watched and followed by other countryside dwellers.

The empirical data obtained in the course of the study was analysed using the statistical hypothesis testing methods. The aim was to reveal if there is any relationship between the answers provided by the respondents and their farm size. The latter is an important variable, which represents the production potential of a particular farm (Ryś-Jurek 2008; Ryś-Jurek 2009; Satola et al., 2014). The majority of the respondents came from the Kujawsko-pomorskie province, so the author adopted the figure of 15 ha, which is the average farm size in the province, as the bordering value separating one group from the other. During the period in which the study was conducted, the average farm size in the province was 15.30 ha (2014), 15.40 ha (2015), 15.51 ha (2016) and 15.77 ha (2017). The figures for the whole country were respectively 10.48 ha, 10.49 ha, 10.56 ha and 10.65 ha (Agency for Restructuring and Modernisation of Agriculture, 2014; Agency for Restructuring and Modernisation of Agriculture, 2015; Agency for Restructuring and Modernisation of Agriculture, 2016; Agency for Restructuring and Modernisation of Agriculture, 2017). The Chi-Square Test of Independence was used to test the relationship between the variables, and the level of statistical significance was established as $\alpha = 0{,}01$. After the presence of the relationship has been confirmed, the author proceeded to define its character (direction) and strength. In order to that, there was established the Pearson contingency coefficient [C] and

the convergence coefficient [g]. Because the convergence coefficient can assume different values depending on which variables are treated as dependent or independent, it was always calculated twice for both events: g_{rc} (convergence: row to column) and g_{cr} (convergence: column to row) (Babbie, 2003; Dziekanski, 2016; Dziekanski, 2017; Gruszczyński, 1986; Sobczyk, 2004). The conducted statistical analysis proved that the differences between both groups were statistically relevant in two cases. The farmers' had different opinions regarding their readiness to undertake non-farming occupation, and they also presented different ideas as far as obtaining extra income was concerned (Table 1). The collected data was complemented by using additional tools such as unstructured and structured interviews. By means of asking supplementary questions, the author was able to obtain additional information, which allowed for more comprehensive approach to the discussed problem.

Table 1 **Respondents' opinions versus farm area – discrepancy significance (the χ2 test results, the Pearson contingency coefficient and the convergence coefficient)**

Respondents' opinions with regards to:	$\chi^2 \, \alpha_{=0,01}$	χ^2	C	g_{rc}	g_{cr}
the possibility to introduce new, or expanding the existing production	13.227	6.102	–	–	–
their willingness to start occupation bringing alternative income	13.227	32.367*	0.416	0.085	0.281
plans to pursue occupations bringing alternative income	16.812	49.591*	0.440	0.034	0.444
incentives in pursuing occupations bringing alternative income	18.475	16.089	–	–	–
barriers in pursuing occupations bringing alternative income	18.475	7.307	–	–	–

*Figure is significant for α=0.01
Source: Own research.

3   Results and Discussion

The research results present as follows: 40.6% of the respondents declared that they perceived the potential to engage in non-farming occupation or expand the existing production, 47.8% opined in the negative, while 11.6% of the polled did not provide a satisfactory answer (Figure 1). The statistical analysis (Table 1) confirmed that there was no relationship between the answers provided by

the respondents and the variable (farm size) distinguishing both groups. What regards questions about farmers' willingness to undertake occupation supplying them with an additional source of income, there were observed statistically relevant differences between the respondents from the two groups (Table 1). It was evident that although the farmers acknowledged the opportunity to start a non-farming occupation, the vast majority did not want to undertake it. Only 27.1% of the respondents admitted that they were ready to pursue such an opportunity (Figure 2). Interestingly, this opinion prevailed among the farmers from smaller farms (50.9%) rather than their colleagues managing larger areas (13.3%). It may mean that farmers managing smaller areas, especially if their production generates insufficient income, seek alternative income more urgently than farmers having bigger farms. In other words, larger farm owners have higher production potential and generate more income. What is more, they may be too busy to have time to pursue additional activities.

Figure 1 **Farmers opinions about the likelihood of introducing non-farming ventures**
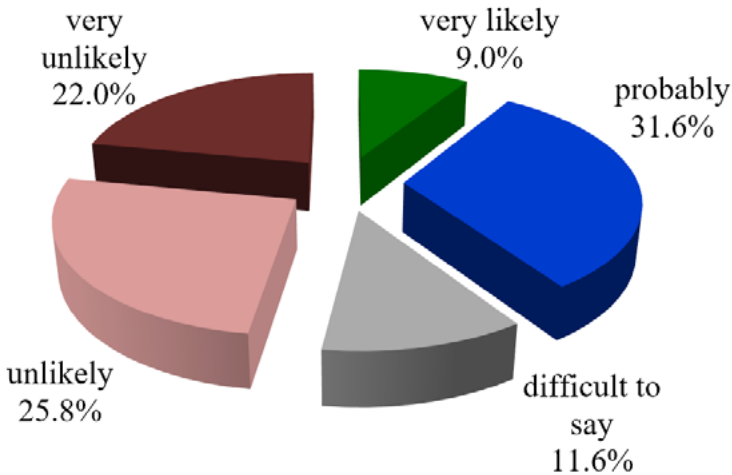
Source: Own research.

Figure 2 **Farmers opinions on pursuing non-farming occupation in the near future**
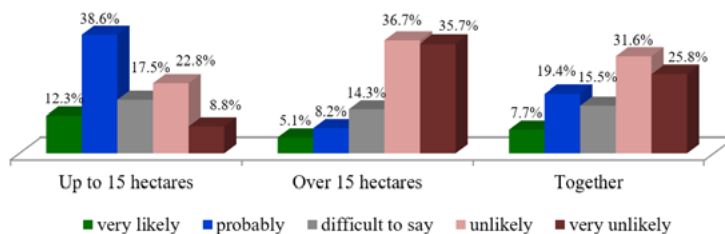
Source: Own research.

The following forms of non-farming occupations were the most popular among the respondents (Figure 3): the trading of farming production tools (fertilizers, herbicides, pesticides, etc.), food and/or clothing (18.1%), hiring out farming tools and equipment (16.1%), providing transportation services (14.2%), running non-farming production, producing crafts, processing food (11.0%) and agritourism (9.0%). What is more, 7.7% of the respondents considered non-farming employment. Again, significant statistical discrepancies were observed between the two groups (Table 1). Firstly, the respondents from smaller farms were more often willing to consider additional occupation. Secondly, the groups also exhibited significant differences as far as the type of the preferred additional activity. Respondents from bigger farms usually opted for hiring out tools and equipment and providing transportation services, which may be the consequence of their farms being better equipped with tools and machines. The respondents from smaller farms favoured different forms of trading, and non-farming occupation – unlike their colleagues from bigger farms, who ranked it third (together with "non-farming production"). These results correspond with the findings of the consumer behaviour study, which confirm that there are numerous consumers who prefer buying foods directly from farmers (Koreleska, 2017; Koreleska, Ziaja 2016). They approve of farmers' dual activity, and expect them to produce and sell food.

Figure 3 **Farmers' ideas regarding starting new ventures, which may become an alternative source of income**
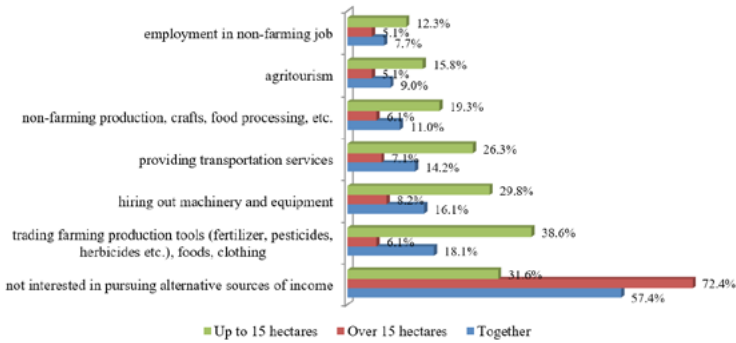
Source: Own research.

Naturally, farmers must consider all advantages and disadvantages of the new enterprise before they make a decision whether to pursue any alternative occupation or not. There is a number of factors which can help farmers to make the correct decision (Begley et al., 2005; Bienkowska-Golasa, 2015; Dobeš et al., 2017; Sikora & Bielski, 2017). Many respondents stressed that, unlike non-farming occupations, managing and maintaining farm production is a considerably more risky business (36.1%). They pointed at the changeable and unforeseen weather conditions (which are unlikely to affect non-farming occupations), unstable food markets and fluctuating food prices, the lack of delivery contracts, which means problems when selling foods, delayed payments, etc. as the main factors contributing to the high risk of running a farm. When compared to farm production, non-farming occupations can offer numerous benefits for entrepreneurs. Not surprisingly the major advantage for most respondents was more attractive income (65.8%). They also mentioned (Figure 4): financial incentives and subsidies available for those who start non-farming ventures (24.5%), surplus of labour in farming jobs which might be used for non-farming purposes (16.8%), high demand for non-farming services and production (12.9%), having interesting ideas for alternative business (7.7%), easy access to bank loans for entrepreneurs (7.1%), and availability of labour due to the high unemployment rate in the area (6.5%). There is a strong correlation between the author's research results and the findings provided by Wojewodzic et al. (2013) who studied the transformation of agriculture in south-eastern Poland. He pointed to different criteria, which may help more experienced farmers to gain advantage over beginners: the experience in running a farm, having assets (such as tractors, property, tools and machinery)

which might be used for other production purposes such as providing various other services, or as a collateral for bank loans. He argues that the existing scope and function of these assets may become limited (e.g. by selling it) or adapted to perform new functions. Other factors giving farmers the market advantage may include (Wojewodzic et al., 2013) the eligibility to apply for a cheaper farming insurance category in the initial stage of the business development, taking advantage of certain financial schemes such as the Public Fund for the Modernization of Agriculture and Rural Areas (development of micro-businesses, changing production profile to non-farming production types).

Figure 4 **Farmers' opinions regarding incentives when pursuing non-farming occupations**
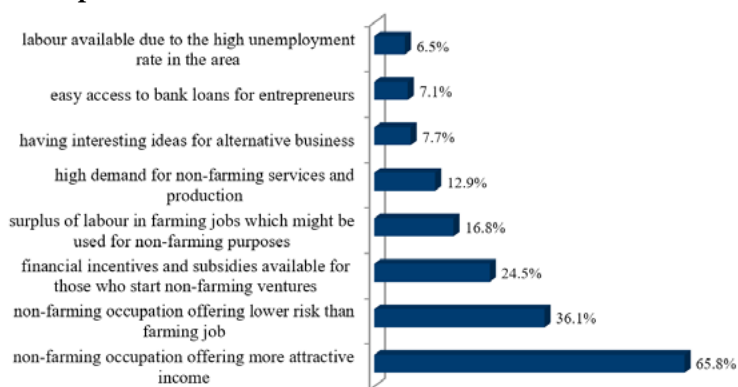
*Total exceeds 100% due to multiple correct answers
Source: Own research.

Unfortunately, there are also numerous obstacles which are likely to discourage farmers from starting new ventures (Meyer et al., 2016; Muhammad et al., 2017). The majority of the respondents pointed at (Figure 5) the lack of economic consulting (58.7%), little or no demand for the new services or products (43.9%), having insufficient financial means to start additional business (36.1%), not having a clear or interesting idea for the new occupation (26.5%), administrative hurdles and difficulty in overcoming them (16.8%), insufficient amounts of labour (13.5%), the fear that the venture will not be successful and will make a loss (10.3%), difficulties in obtaining cheap bank loans, which would guarantee sufficient funds for the new venture (9.7%). The lack of financial means needed for launching a non-farming business venture could be remedied by using the EU structural funds available within the framework of different operational

programmes (Satoła, 2009). However, in order to benefit from the funds, one must go through a lengthy and comprehensive application process.

Figure 5 **Farmers' opinions regarding barriers when pursuing non-farming occupations**
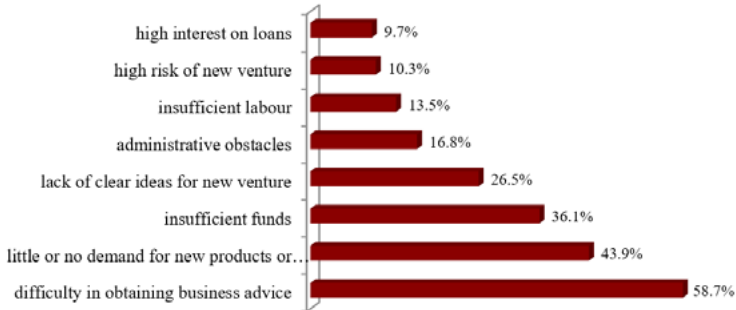
*Total exceeds 100% due to multiple correct answers
Source: Own research.

4   Conclusions

The study results proved that the majority of farmers were familiar with the issue of non-agricultural occupation. Although many of them saw the potential to expand their existing agricultural production to encompass new functions, few were ready to follow this path in the near future. Not surprisingly, the latter group predominantly included students living or managing smaller farms, which have smaller potential of agricultural production. Not surprisingly, these farmers seek additional sources of income, and the solution seems to be in the increasing of operational diversity. The most popular types of additional, non-farming occupations in the studied group were: different forms of trading, hiring out machinery and tools, and providing transportation services. The respondents knew of numerous incentives allowing them to pursue activities other than farming. They emphasized the prospect of increasing their income, while running a lower risk than in the case of farming production. They also mentioned the potential to obtain financial support from the funds reserved for the entrepreneurs who start new business ventures. At the same time, the respondents were aware of several serious barriers, which rendered any alternative business initiative unprofitable. They stressed the difficulty in obtaining professional business advice, little or no demand for the new products or services, having insufficient financial means to

start additional business and, finally, lacking in interesting ideas for new business ventures.

It must be stressed that the study focuses on a relatively small group of Master's students of Agriculture, a mere fragment of the whole farmer population in Poland, who have already run their own farm or were about to acquire it from their parents in the near future. Therefore, one should not generalize and apply the study findings to all Polish farmers. Having said that, the studied group may be regarded as innovators who will exert influence on the shape and development of the countryside. They are likely to introduce changes to their farming activities, and they are likely to be treated as innovators by the farming community. Therefore it is imperative to make them aware about the need to make these changes, becoming entrepreneurs and diversifying their income.

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ALGORITHM FOR CALCULATING SIZE AND NUMBER OF DAIRY CATTLE FOR EARNING SMALL FAMILY FARM´S LIVING IN CONDITIONS OF THE SLOVAK REPUBLIC

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Abstract

Slovakia's agricultural policy is based on the Common Agricultural Policy ("CAP"). One of the objectives of the CAP reform in the dairy sector is to contribute to increasing its competitiveness and market orientation, especially in view of the increasing demand for milk and dairy products in the world market. The reform of the SPP in the milk and dairy products sector has focused production on market requirements and the aid is not linked to production but is geared to meeting food safety, animal welfare and environmental requirements.

The aim of the submitted paper was to calculate the minimum size and the minimum number of dairy cattle needed to cover the consumer expenditures of the family farm farming in mountain production conditions in the Slovak Republic. As a small family farm, we defined a 4-member family - 2 adults and 2 children, based on the assumption that the family will not process milk but will sell it. We also assume that the family will not employ other workers. The calculations show that to cover household consumption expenditures, which was amounted to 18,607 Euros in 2015, the area of the meadows is 40.85 ha and the area of the pastures is 28.83 ha, which together represents 69.68 ha of agricultural land. Regarding the structure of cattle, the farm will record 10 dairy cows, 5 calves, 9.39 heifers, 0.44 heavily pregnant cows and 6.37 fattening cattle. If a farm will record higher farmland sizes and higher animal numbers, it will only have a positive economic impact on family management.

Keywords: *farm size, agricultural land, dairy production, costs*

JEL classification: *Q12*

1   Introduction

Entrepreneurship on the agricultural land belongs among the oldest economic sectors of every country. Slovakia and its countryside was for many centuries a typical agrarian country. Despite the areal industrialization after 1950 agriculture remained its characteristic feature. Evidential sector organization of agricultural production was created as a result of manufacturing expansion. It was caused by industrialization process. It caused largely one-side orientation of rural regions towards the agricultural activities. In the current era of globalization, especially after the accession to the EU, the position of agriculture is changing especially in the trend of EU CAP reforms (Horská, Nagyová & Felixová, 2010; Kleinová &Neománi, 2010).

Obviously, the evolution of agriculture has important impacts on individual farmers. The rising size of a farm necessary to provide a reasonable level of farm income forces those with smaller holdings to expand beyond a single family operation, seek off-farm employment or exit from the agricultural sector altogether and thus constitutes a direct link between farm structure (structural change) and individual producer welfare. (Weiss C. R., 1998)

Agricultural entrepreneurs are indeed facing many challenges. Many of these have been identified by the Common Agricultural Policy as economic in nature, such as food security and globalization, a declining rate of productivity growth, price volatility, pressures on production costs due to high input prices and the deteriorating position of farmers in the food supply chain. Other challenges are environmental in nature, relating to resource efficiency, soil and water quality, and threats to habitats and biodiversity. Others still are territorial, especially where rural areas are faced with demographic, economic and social developments, including depopulation and relocation of businesses (European Commission, 2013).

There is considerable debate regarding what type or scale of agriculture should be promoted in order to most effectively achieve these goals (Larson, Otsuka, Matsumoto & Kilic, 2014).

Nagayets (2005) used agricultural census data from FAO to estimate that there are about 525 million farms of all sizes in the world. Several other sources maintain that worldwide there are about 500 million farms smaller than 2 ha (see for example Hazell et al., 2010; Wiggins et al., 2010; IFAD, 2011 and HLPE, 2013), many of them refer to Nagayets (2005).

There are many authors who are calculating with size of farm and economical results. Some results show that there is a negative relationship between farm size and productivity and positive relationship between credits and productivity. These results were statistically significant in all models at coefficient estimation

using the method of least squares and the fixed effect model. According to the reached results by authors Ladvenicová and Miklovičová (2015) can say that for Slovak farmers it would be better to operate on smaller size of farm than they do. Many studies estimated that in agriculture there are constant returns to scale. In our case we can follow decreasing returns to scale – each hectare of land leads to the decrease of production. Positive effect can be follow in credits. Access to credits can depend on farm size. If the amount of credits depends on collateral, then larger farms may have easier access to credits. They can use more inputs and it causes that productivity will depend positively on farm size.

Many authors are solving problem relationships between farm size and sustainability. Large-scale dairy farms had a higher labor productivity and NFI than other dairy farms, without compromising on phosphorus surplus, energy use or ghg emission. Higher profits were accompanied by a lower solvency ratio on large-scale farms. Pesticides use, however, was higher on large-scale dairy farms due to a lower share of grassland. Large-scale farms had a shorter cow lifetime and applied less grazing compared to other dairy farms.(Meulen, Dolman, Jager & Venema, 2014).

In the USA larger farms are more likely to be profitable than small farms (those with GCFI of less than $350,000), reflecting economies of size in farming. Smaller farms in the critical zone typically do not earn enough from the sale of farm commodities and ancillary services to cover expenses: cash expenses exceed cash receipts for the 70 percent of the farms with GCFI below $100,000 that are in the critical zone. The share of farms in the critical zone is especially high for retirement, off-farm occupation, and low-sales small farms—which together account for 98 percent of farms with GCFI less than $100,000—but tapers off rapidly for larger farms. (Hoppe, 2014)

The aim of submitted paper is to determine the minimum size of agricultural land and number of dairy cows of a small family farm focused on dairy production in the economic and production conditions of the Slovak Republic. Under the term farm family, we mean family with 2 adults and 2 children. In the paper we analyze the dairy cow farm and its breeding (calves, heifers, cattle fattening - closed turnover of the herd). The paper deals with the possibilities of family farms in mountain areas, where less meadows and pastures are used.

2   Data and Methods

For determination of the farm size value and the number of livestock in the cattle category of a small family farm, we can determine the following algorithm.

Each step of the algorithm must be unambiguously and precisely defined; in each situation, it must be fully clear what and how to do and how will the algorithm continue.

Algorithm usually works with some inputs, quantities that are available before or during the activity. Inputs have defined sets of values they can acquire. The algorithm has at least one output, quantity that is in the desired relation to the inputs, thus forming the answer to the problem that the algorithm solves. In general, we require that the algorithm has to be effective, in the sense that we require each operation required by the algorithm is simple enough to be at least in principle converted at the end time only by the use of pencil and paper. The algorithm does not solve one specific problem (e.g., "how to calculate 3×7"), but solves a general class of similar problems (e.g., "how to calculate the product of two integers").

Figure 1 **Scheme of Algorithm for Calculation of Acreage and Number of Animals**
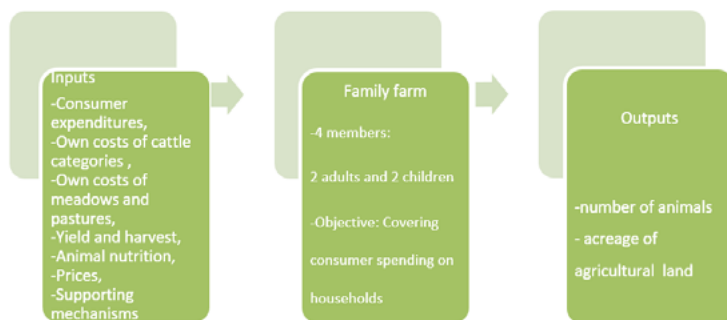
Source: Own processing.

The algorithms for determining the size of a family farm focused on dairy farming of beef-cattle in the mountain production area in the economic and production conditions of the Slovak Republic were given the following inputs:
1. Annual consumer expenditures of the average four-member family,
2. Own costs of cattle categories,
3. Own costs of meadows and pastures,
4. Producers prices for milk and meat,
5. Support mechanisms in mountain areas in beef-cattle farming and in meadows and pastures,
6. The average annual yield of the different categories of livestock (beef-cattle),
7. Average annual yields of meadows and pastures,

8. Nutrient and Nuclear Feed Needs and Purchase of Other Mineral Ingredients, etc.

The outputs of the presented algorithm will be the following variables:
1. Acreage of meadows and pastures required for beef-cattle breeding,
2. The numbers of animals by individual accounting categories,

Mentioned cost calculations were drawn from the publication "Costs and Income of Agricultural Products in the Slovak Republic" by Research Institute of Agricultureand Food Economics. The publication contains the results of the selected set of agricultural holdings for the year 2015 in the breakdown by production area. The publication provides data on the actual costs of selected crop and animal products and other economic data to assess the efficiency of production.

3   Results and Discussion

Livestock production is the second most important sector of agricultural production. It is part of a closed farming system and an important co-founder of the environment. It plays an important role in the closed chain consisted of soil-plant-animal-soil. Animal products provide 48% of protein consumption in Slovakia and more than 40% of agricultural production revenues.

An important fact for the agricultural enterprise is fact that livestock sales are distributed and regular throughout the year. The importance of livestock production in enterprises operating in worse climatic conditions is increasing. This means that businesses in mountain and under-mountain conditions cannot manage without it.

In the European multifunctional farming, the beef-cattle breeding performs more important tasks. They can be simply defined as tasks of a productive and non-productive nature. The production mission of livestock is the production of the main commodities - milk and meat, which have a significant role in human nutrition and contribute significantly to the revenues of agricultural subjects (on average in the Slovak Republic these account for about one quarter of agricultural production revenues and more than half of livestock production revenues). In addition, milk production ensures a continuous supply of cash. Production of high quality livestock manure can also be included in production functions. The most important non-productive livestock functions are important contributions to maintaining the cultural landscape and the social function resulting from the existence of employment opportunities in this sector. (Brestenský, 2015)

Grazing as the cheapest and the most natural form of cattle nutrition has and always will have a special meaning. Different habitats, production, economic and other conditions determine the intensity of management and corresponding grazing systems. The primary aim of the grazing system is to adapt the quantity and quality of the grass to be delivered during the season to the needs of grazing animals.

Grazing of dairy cows positively affects their health. The feed of milk- cows uses the principle of ad libitum feeding. It is a feeding technique when animals can receive as much feeds as desired. The feeding is sufficient to cover milk production on 8-14 kg of milk per dairy cow per day. The causes of a decrease or increase in milk production depend on the vegetation stage of the skewed grassland.

This means that if the skewed grassland is over seasoned, milk production decreases. If the grassland is younger at the beginning of grass- blade creation, the milk production of milk- cows grows. This dependence is given by the concentration of energy in the grassland which gradually decreases with aging.

In the submitted calculations, the authors predict the average production of milk from grassland at the level of 10 kg per 1 feeding day, which represents 3,050 kg of milk per milk- cow. When reaching such a level of nutrition, we can regulate the feeding of concentrated feeding stuff depending on the overall performance of the dairy cows. Production feed mixtures are given to dairy cows for each kilogram of milked milk excessing the basic production from the bulk feed (grass and hay).

The amount of feed required for each kilogram of milked milk depends on the nutritive content in 1 kg of the compound feed. In our calculations is calculated that dairy cow produces 2 kg of milk from 1 kg of compound feed.

During life, the beef-cattle go through different stages of development, which is economically evaluated by calculating as direct costs spent on calculated output, which in the shortest term expresses - the production costs.

In beef-cattle breeding aimed at milk production, we measure the following calculation breeding categories:
- calves (from birth to 6 months),
- rearing of young cattle (heifers from 6 months to 7 months),
- heavily pregnant cow (in 8th and 9th month of gestation),
- cattle fattening (bulls from the age of 6 months to carcass maturity);
- cows (from 1st harvesting to disposal).

Herd turnover expresses quantitative relationships between categories and groups of livestock. The herd turnover is based on the number of born calves, the growth intensity and the breeding rate in the offspring. Therefore, detailed age categorization needs to be made, in line with biological change and housing options. From the herd turnover it is possible to determine the length of stay and the

number of animals in each breeding category. For the herd turnover calculation, it is also crucial to assume the reproductive and utility parameters of the animals. In our paper we assume that each dairy cows are fed once a year and half of the born calves will be heifers and the other half will be the bulls. From the herd turn-over was calculated the expected status of breeding bulls and heifers in individual breeding categories. The calculation is based on the residence time of the animals in the given category and the number of animals assigned and eliminated.

Our calculations show that for one dairy cow is the structure of other breeding categories based on the following coefficients (Table 1):

Table 1 **Indicators of the Conversion of Other Accounting Categories per 1 Structured Dairy Cow**

Calves 0-6 months	**0.50**
Rearing of young heifers	0.94
Cattle fattening (bulls)	0.64
Heavily pregnant cows	0.04

Source: Own calculations.

The above coefficients indicate that in average on one cow is 0.50 calves at the age of 0-6 months, 0.94 heifers, 0.64 fattening bulls weighing 550 kg and 0.04 heavily pregnant cows (cows in the 8th and 9th months of pregnancy).

The herd turnover serves us to calculate the length of stay in feed days for each category, and on the basis of feed days, we calculate the feed balance. From the feed balance we calculate the required acreage of meadows and pastures in hectares for all categories of livestock.

The utility parameters of dairy cows and breeding categories were taken from the Research Institute of Agricultural and Food Economics from NAFC. The publication "Own costs and farm performance of agricultural holdings in the Slovak Republic" also shows growth increments by individual breeding categories per 1 feed day and yields of dairy cows for 1 year.

The following cost items have been included in the own cost of breeding:
– medication and disinfecting material,
– other direct material (consumption of cleaning and minor maintenance material for the maintenance of single-purpose buildings and structures for animal production and consumption of low – value tangible property),
– repairs and maintenance,
– depreciation of tangible investment property
– depreciation of animals,

– breeding and veterinary services,
– other direct materials and services (consumption of electricity and other energy in stables, consumption of other non-storable supplies such as water for animals and for technological purposes, costs of deratization and disinfection, other services related to a particular holding, e.g. rent for stables and other single-purpose machines and equipment, real estate tax, i.e. from stables and other structures used in individual holdings, other operating costs, insurance against damages in animal production, or interest, if they relate directly to a particular breed, etc.)
– costs of auxiliary activities (freight transport, tractors, coatings for the import of feed and animal bedding, manure removal and other intra-plant work for certain livestock breeding, which will be included in the aliquot amount in the individual costs of each breed.)

The paper aims at determining the minimum number of animals and the minimum size of agricultural land in hectares needed by small family farms to cover average consumer expenditure. As a small family farm in the described algorithm is a family with 4 members.

The algorithm is based on the assumption that besides the cows of a basic herd, we also have to calculate the following accounting categories of animals: calves 0-6 months, rearing of young heifers, bulls fattening and heavily pregnant cow. Another assumption in the calculations is the fact that in our paper, the proposed algorithm is applied in the mountainous production and economic conditions of the Slovak Republic. It means that from the above mentioned, the farm will have only meadows and pastures and no arable land. The compound feeds will have to be secured from the external sources and the meadows and pastures will be used for grazing respectively the hay production for the winter fodder season.

The algorithm for calculating the size and number of livestock is based on the average yield of dairy cows in mountain production conditions and on the price of milk per 1 liter according to NPPC. In addition, the production and reproduction indicators are included in the calculations for individual animal categories:
– Braking of dairy cows 25%, Elimination from breeding is referred as braking and is expressed in %. In case of 25% braking, the basic herd is changed every 4 years.
– Price of braking meat is 1.5 Euro per 1 kg of live mass.
– Average slaughter weight of braking dairy cows is 500 kg.
– % of natality 100%, i.e. we plan to breed one calf per dairy cow a year on the basis of the assumption that half of the born calves will be bulls and the second half will be heifers.

The fertility of meadows and pastures together with the costs were taken from NPPC as a mountain production area. The yield of meadows in green matter is 9.75 t.ha-1 and the yield of pastures is 6.91t.ha-1 in the production and economic conditions of the mountain regions of the Slovak Republic. For pastures, we plan to consume 55 kg of green matter per 1 feed day and 1 dairy cow during the summer period of 185 feed days. In the winter, we plan to feed the hay that we produce on the meadows where we plan with 11 kg of hay for 1 feed day and 1 cow. The grassland stockpile on trampled pastures is scheduled to be 30%. The loss of hay is 10%. Reserve of the whole food balance is 15%, which is recommended by Slovak researchers for the stability of the production of bulk feeding stuffs.

Table 2 **Indicators of Dairy Cows Breeding**

Indicator	unit	value
DAIRY COWS	pcs	10
UTILITY	l	5,370
PRICE FOR 1 LITER OF MILK	EUR	0.3
BORN CALVES	pcs	10
REVENUES FROM BRAKING	EUR	1,875
REVENUES FROM MILK	EUR	16,108
REVENUES FROM DAIRY COWS	EUR	17,983
REPRODUCTION OF CALVES IN PIECES		
BORN CALVES TOTAL	pcs	10
-of which heifers	pcs	5
-of witch bulls	pcs	5
THE YIELD OF MEADOWS IN GREEN MATTER	T	9.75
THE YIELD OF PASTURES IN GREEN MATTER	T	6.91
-CONSUMPTION IN GREEN MATTER PER FEED DAY	KG	55
PASTURES – AREA	HA	14.32
MEADOWS – AREA	HA	10.43
MILK PRODUCTION FROM 1KG OF COMPOUND FEED	LIT	2
MILK PRODUCTION FROM GRAIN FEED	LIT	2,319
REQUIREMENT FOR COMPOUND FEED FOR 1 DAIRY-COW PER YEAR	KG	1,159
PRICE FOR 1 KG OF COMPOUND FEED	EUR	0.27
OWN COSTS OF COMPOUND FEED FOR DAIRY COWS (ALL) PER YEAR	EUR	3,131
COSTS OF 1HA OF MEADOWS	EUR	96.33

Indicator	unit	value
COSTS OF 1HA OF PASTURES	EUR	63.29
LOSSES OF TRAMPLED PASTURES	%	30
AREA OF PASTURES + FEED STOCKPILE	%	15
AREA OF PASTURES + FEED STOCKPILE + HARVESTING LOSSES	HA	13.20
AREA OF PASTURES + FEED STOCKPILE +LOSSES OF TRAMPLED PASTURES	HA	21.41
OWN COSTS MEADOWS + PASTURES + COMPOUND FEED	EUR	5,758
DIFFERENCE = REVENUES /MEAT + MILK/ - OWN COSTS OF FEED	EUR	12,225
COSTS FOR 100 FEED DAYS	EUR	229.11
OWN COSTS OF 10 PCS OF DAIRY COWS PER YEAR	EUR	8,362
OWN COSTS TOTAL (CROP AND LIVESTOCK PRODUCTION)	EUR	14,121

Source: Own calculations.

In the calculations, we expect milk to be produced at a volume of 10 liters and the remaining will be produced by cows from the bought grain feed. Production efficiency of 1 kg of grain feed is 2 liters of milk (i.e., from 1 kg of grain feed, the dairy cow produces 2 liters of milk). From the above calculations, the proposed farm produces 3,051 liters of milk from bulk feed and 2,319 liters of milk from grain feed per dairy cow for a single accounting year. On the basis of these nutrition adjustments for dairy cows it is necessary to buy 1,160 kg of the production compound feed for one dairy cow. The price of compound feed is 0.27 Euro per 1 kg.

Table 3 **Overview of Calculated Basic Indicators in Dairy Cattle Breeding**

Indicator	Unit	Dairy-Cows	Calves 0 – 6 Months.	HEIFERS From 6th To7th Month Of Pregnancy	HEAVILY PREGNANT COWS	FATTENING CATTLE	TOTAL
Number of animals	pcs	10.00	5.00	9.39	0.44	6.37	10.00
Area of meadows required for breeding	ha	13.20	2.96	13.34	1.24	10.10	40.85

Indicator	Unit	Dairy-Cows	Calves 0 – 6 Months.	HEIFERS From 6th To7th Month Of Pregnancy	HEAVILY PREGNANT COWS	FATTENING CATTLE	TOTAL
Area of pastures required for breeding	ha	21.42		7.41			28.83
Area of the whole crop + livestock production	ha	34.62	2.96	20.75	1.24	10.10	69.68
Own costs total (crop+ livestock production)	EUR	14,121.36	1,785.08	3,231.28	296.94	3,042.84	22,477.50
Revenues	EUR	17,983.98	0.00	0.00	0.00	4,381.06	22,365.04
Subsidies for crop production (meadows and a pastures)	EUR	8,655.09	739.94	5,187.85	310.95	2,525.74	17,419.58
Subsidies for livestock production	EUR	1,300.00	0.00	0.00	0.00	0.00	1,300.00
Revenues +Subsidies (crop+ livestock production)	EUR	27,939.08	739.94	5,187.85	310.95	6,906.80	41,084.62
(REVENUES +SUBSIDIES FOR FARM) – OWN COSTS	EUR	13,817.72	-1045.14	1,956.58	14.01	3,863.95	18,607.12

Source: Own calculations .

Table 3 shows the calculated basic indicators for the area of meadows and pastures for the feeding of 10 dairy cows, their costs, revenues and subsidies.

Revenues from dairy cows consists of revenues from sold milk / 16,108 EUR / and revenues from braking meat of dairy cows / 1,875 EUR /. Based on the model farm model calculations, the total sales of dairy farms reached 17,983 EUR.

The costs of dairy cows in the present model calculation consists of the cost of the total area of meadows and pastures, which includes the harvesting losses, losses of trampled pastures grazing pastures and the feed stockpile. The cost per 1 hectare of meadows reaches a cost of 96.33 EUR and a pasture 63.29 EUR. According to our calculations, the area of meadows for feeding the dairy cows is 13.2 ha and area of pastures is 21.4 ha. The total cost of the bulk feed was 2,626.5 EUR. The cost of dairy farming is also the bought feed, whose value reached 3,131 EUR. The cost of medications, depreciation and other costs related to livestock described in the methodology are amounting to 229,11 EUR for 100 feed days and for whole breeding is total 8,362 EUR for 10 dairy cows and 1 year. From the above calculations results that the total cost of dairy cow breeding, including feed, compound feed and livestock costs, is EUR 14,121.36.

Subsidies for the model farm consist of subsidies for area of meadows and pastures amounting to 8,655.09 EUR and subsidies for diary-cows breeding worth 1,300 EUR. The total subsidies for dairy cow breeding / crop + livestock / are 9,955.09 EUR.

In Table 3, indicators are also calculated not only for the category of dairy cows, but also for the other breeding categories: calves, heifers, heavily pregnant cows and fattening cattle.

The calculations show that household consumption expenditure, which in 2015 was 18,607 Euro (for a 4-member family), requires the meadows area of 40.85 ha and pastures area of 28.83 ha, which together represents 69.68 ha of agricultural land. Regarding the structure of cattle, the farm will record 10 dairy cows, 5 calves, 9.39 heifers, 0.44 heavily pregnant cows and 6.37 fattening cattle. If a farm will record higher area of agriculture land and higher animal numbers, it will only have a positive economic impact on family management.

The aim of agricultural policy in the dairy sector in Slovakia is to produce and process milk to ensure its domestic consumption. It is particularly important to increase consumption, as we belong to the countries with the lowest milk consumption in the EU. Therefore, it is necessary to focus on the following:

- to stabilize the numbers of cattle and dairy cows and preferentially increase their reproductive and utility properties
- to inform and educate consumers about the importance of nutrition, to increase the promotion of milk and dairy products
- to increase the competitiveness of agricultural and food products (raw cow's milk and products)

- to create the conditions for the sale of domestic products through direct sales from the yard and support the sale of domestic products
- to use the new scientific knowledge to innovate products and innovative technologies that meet good manufacturing and hygiene practices that do not have a negative impact on the environment
- to support the training of primary producers of milk in the area of management and marketing of enterprises.

4   Conclusion

Slovakia's agricultural policy is based on the Common Agricultural Policy ("CAP"). One of the objectives of the CAP reform in the dairy sector is to contribute to increasing its competitiveness and market orientation, especially in view of the increasing demand for milk and dairy products in the world market. The reform of the SPP in the milk and dairy products sector has focused production on market requirements and the aid is not linked to production but is geared to meeting food safety, animal welfare and environmental requirements.

The aim of the submitted paper was to calculate the minimum size and the minimum number of dairy cattle needed to cover the consumer expenditures of the family farm farming in mountain production conditions in the Slovak Republic. As a small family farm, we defined a 4-member family - 2 adults and 2 children, based on the assumption that the family will not process milk but will sell it. We also assume that the family will not employ other workers. The calculations show that to cover household consumption expenditures, which was amounted to 18,607 Euros in 2015, the area of the meadows is 40.85 ha and the area of the pastures is 28.83 ha, which together represents 69.68 ha of agricultural land. Regarding the structure of cattle, the farm will record 10 dairy cows, 5 calves, 9.39 heifers, 0.44 heavily pregnant cows and 6.37 fattening cattle. If a farm will record higher farmland sizes and higher animal numbers, it will only have a positive economic impact on family management.

Acknowledgements

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HUMAN CAPITAL IN THE ASPECT OF RAISING INNOVATIVENESS IN RURAL AREAS

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Abstract

The aim of this article is to show the importance and necessity of improving the quality of human capital in the aspect of increasing the level of innovation in rural areas. The key problem is, first of all, waste of human capital and difficulties in shaping awareness and desirable attitudes among residents of rural areas. The desk research method was used for the analysis. Human capital and innovations form a network of interrelationships and dependencies, and the conducted research and analyses aimed at better recognition of said dependencies allow to formulate and direct further research. The development of human capital and care for its quality as well as the associated increase in innovation of rural areas is the primary goal of EU member states' policies. This can be seen in various newer and newer solutions and implemented projects as well as the number of institutions participating in

their implementation. More and more attention is paid to the needs and problems of various social groups in rural areas, e.g. senior farmers, where effective use of the potential of this group is becoming a challenge in the face of an aging population. As part of improving the quality of human capital and the innovativeness of rural areas, not only financial assistance but also widely-developed advice is available. There is a need to deepen research in order to clarify the correlation between the quality of human capital and the innovativeness of rural areas, including the search for new support instruments.

Keywords: *human capital, innovations, innovativeness, rural areas, support instruments*

JEL classification: *J24, O15*

1   Introduction

The contemporary image of agriculture and rural areas is constantly changing. These changes depend on the farming model, which requires farmers to possess comprehensive knowledge and practical skills that enable a reduction in the negative impact of agriculture on the natural environment, while maintaining a high standard of living in the countryside, producing high quality food and implementing innovation (Roman, Roman, Roman, 2018).

Human capital and innovations can be considered as strategic factors in the development of a knowledge-based economy, including rural areas. In a globalized world, levelling the disparities between the country and the city is a big challenge. The key problem is the waste of human capital and difficulties in shaping awareness and desirable attitudes among rural populations. This situation has significantly improved after Poland's accession to the European Union in connection with the implementation of the objectives resulting from the Cohesion Strategy, the use of funds for the development of human capital and the implementation of innovations, particularly in rural areas.

The aim of this article is to show the importance and necessity of improving the quality of human capital in the perspective of increasing the innovation of rural areas. It is thanks to people, their knowledge, skills, competences and attitudes that it is possible to implement innovations, and thus improve the quality of life of people in rural areas as well as the services or products that they produce. This article focuses on examples of implementing innovations in the rural areas of Poland and on available instruments supporting the development of human capital and influencing the growth of innovativeness of particular regions.

2   Material and methodology

The desk research method was used for the analysis. The choice of methods determined the availability of source materials (including literature on human capital, rural areas, innovation, documents, reports, Cohesion Strategy), which allowed to establish facts, verify data and present the results obtained. The study allowed to identify areas that require in-depth research, i.e. showing the correlation between the quality of human capital and increasing the innovativeness of rural areas. An attempt was made to verify a hypothesis: human capital and innovations can be considered as strategic factors in the development of a knowledge-based economy, including rural areas. It should be noted that the development of human capital and increasing the innovation of rural areas is the focus of attention for many organizations, both local governments and non-governmental institutions or foundations (financing, consulting, developed strategies, etc.). More and more attention is being paid to the determinants of this development in the context of diverse needs and capabilities of particular social groups. Human capital and innovations form a network of interrelationships and dependencies, and conducted research and analyzes aimed at better recognition allow to formulate and direct further research, which is also the essence of this article.

3   Quality of human capital in rural areas

Concepts of human capital have evolved over the years, partly as a result of globalization processes taking place, which is why one can find its definitional diversity in literature. Definitions of human capital usually include elements of personality, traits or human abilities (intellectual dexterity, mental efficiency, intelligence, energy, mental receptivity, ability to analyze and synthesize, reason) (Król, 2016).

According to the OECD definition, human capital is the knowledge, skills, abilities and other appropriate attributes that facilitate the creation of personal, social and economic well-being. In this context, human capital should be considered in terms of its creation, maintenance and use (Kacprzak & Król, 2015).

Undoubtedly, it is human capital that forms a strategic factor for the development of a knowledge-based economy in a globalized world (Kacprzak, Król, Wielewska, 2017). The impact of human capital on the development of regions through the increase of their innovativeness also began to be increasingly recognized. Thus, the higher the level of human capital and its quality is, the more visible its impact will be on the growth of innovation of particular regions of the country or areas of the economy. However, the quality of human capital can vary significantly between particular areas. The key challenges in improving the

quality of human capital in rural areas include facilitating access to knowledge, information using new technologies, development of competences (education system) and technical (e.g. communication) infrastructure and social (improving the standard and quality of life of the rural populations), increasing activity on the job market, undertaking actions for sustainable development (care for the natural environment) and promoting pro-innovation attitudes (Strategy for responsible development by 2020, 2017).

The knowledge possessed and the ability to develop and use it constitute the basis for managing each organization, also in the agricultural sector. These are one of the main factors affecting the effective management of an agricultural holding. An important problem is overcoming barriers that appear in knowledge management processes in rural areas, and taking into account the functions that these areas have for the community (Kiełbasa, 2016). Rural areas are becoming more and more multifunctional (agricultural, non-agricultural, semi-agricultural), therefore the quality of human capital will determine the degree of innovation implemented in particular areas of activity, and this will be reflected in the level of development of individual regions of the country. Efforts should be made to make the most of any and all available funds for rural development. Investing in human capital in rural areas is possible thanks to the possibility of using a range of available instruments from both the EU and the national rural development policy, which significantly affects the quality of human capital. Poland is one of the few EU countries that allocates a relatively large amount of funds to investments in human capital in these areas. The determinants of this state of affairs are primarily large disparities in the structure of human capital in farmers and other rural residents, the educational gap between rural and urban populations and a relatively small percentage of Polish farmers characterized by pro-innovation thinking and attitudes as well as anxiety of professional mobility. It is true that there is a change in parents' attitudes towards their children living in rural areas, noticeable primarily in reducing their share of work on the farms and creating favourable conditions for study and development; there is even a change in organizing various forms of recreation. This is now reflected in the increase in educational ambitions of youths from rural areas, the number of young people with a college degree increases, which in turn causes migrations of the youths to seek employment in cities, while relatively few of them decide to undertake non-agricultural activities in rural areas. However, young people are undoubtedly more marked by pro-innovative attitudes than older people. Therefore, the level of education, health status and environmental protection can be considered as key indicators of the quality of human capital.

As Kwiatkowski (2000) suggests, it is innovativeness, the capability and manner of learning as well as certain features that, apart from formally owned knowledge and skills, determine the economic success of the individual.

The CSO (Central Statistical Office) prognosis until 2030 indicates a tendency of a population decrease by about 8%, along with the aging of the population, which for Poland would mean a reduction in the percentage of rural population of the Poles to around 35.9% in 2030 (Kozera, 2011).

4 Human capital of senior farmers

One of the contemporary challenges to be faced is the problem of an aging population. Older people also constitute untapped capital, primarily in rural areas. In Poland, only recently (2016-2017) was an attempt made to solve this problem. The Ministry of Agriculture and Rural Development prepared two projects under the Strategy for Responsible Development, i.e. a 'caring household' and 'active and healthy senior farmer'. The essence of caring farms boils down to combining agricultural activity with care for elderly people in need of support. Funds for the implementation of those projects will come from the National Rural Network under the Operational Plan 2018-2019, the Regional Operational Program or POWER, to name but a few. The main implementer of the project is the Agricultural Advisory Centre in Brwinów, Branch in Kraków. The project "Caring farms – building a cooperation network" (network for innovation in agriculture and in rural areas) has already been launched. The Kujawsko-Pomorski Agricultural Advisory Centre is currently implementing the project "Green care – caring farms in Kujawsko-Pomorskie Province" (OP 2014-2020, priority axis 9, Solidarity Society, Action 9.3 Development of health and social services of the Poles, Subchapter 9.3.2 Development of social services). As part of the project, 15 care farms were created from the following districts: Brodnica, Mogilno, Świecie, Tuchola and Wąbrzeźno (consultancy, individual classes, training workshops, trips to get to learn about good practices in other farms, a pilot project for 225 people). The Agricultural Social Insurance Fund implements the project "Active and healthy senior farmer", whose aim is to develop a comprehensive system of care and rehabilitation of elderly people from rural areas (a pilot project). It is part of the larger project "Healthier society – human and social capital in the Strategy for Responsible Development (agronews.com.pl).

5   Innovations in rural areas

The notion of innovation is derived from the Latin word *innovatio*, which means renewal. Literature reveals a multitude of definitions of innovation. The concept was introduced into economic sciences by J. Schumpeter. In his opinion, innovations consist in:

– introducing new products into production or improving existing products,
– introducing a new or improved production method,
– opening a new market,
– applying a new method of sale or purchase,
– using new raw materials or semi-finished goods,
– introducing a new production organization (Bujak, 2011).

Innovation is also understood as "the entire management process, including various activities leading to the creation, development and introduction of new values in products or new combinations of resources and resources that are a novelty to the entity creating or introducing them" (Bujak, 2011).

The primary goal of innovation are changes leading to the increase in modernity and competitiveness, which means high activity in acquiring resources and skills necessary to participate in these processes (Wielewska, 2017).

For the purposes of this study, the authors adopted a definition that reads: "Innovation is every change made to a farm that improves something, gives a new quality or allows to create a new product (or service). Innovation may be the introduction of a new production method, the opening of a new market, or the acquisition of a new source of raw materials, as well as the introduction of a new way of organizing work "(Tabaka, 2015).

As A. Tabaka (2015) suggests, the Warmińsko-Mazurski Agricultural Advisory Centre in Olsztyn has developed several model examples of innovations together with their practical application in farms. They were based on four key types of innovations, i.e.:

– economic,
– social,
– organizational,
– technological.

Examples of economic innovations include activities related to the creation of new sales or distribution channels, e.g. by opening online stores or on farms. The assumed effect of such an innovation is to become independent of intermediaries. Another example concerns improvements in the field of marketing, through: joint promotion of products by a group of farmers, making of a new logo, distribution

of leaflets and other promotional campaigns (stands at festivals, fairs, etc.). The assumed effect of such an innovation will be increasing direct sales and obtaining higher prices of sold products. The third example of economic innovation boils down to the creation of the so-called purchasing groups and, as a result, increasing negotiating possibilities and shortening the food chain. Yet another example is the possibility of using renewable energy sources in joint heating of farms. The assumed effect of implementing such innovations is the reduction of energy costs on farms and energy independence on the one hand, and on the other, the protection of the natural environment. This is also confirmed by research, including I. Wielewska (2016), D.K. Zuzek (2007), D. K. Zuzek and B. Mickiewicz (2014), A. Ostrowska, W. Sobczyk and M. Pawul (2013) and W. Sobczyk, P. Pelc, B. Kowal, R. Ranosz (2017).

The second group of innovations is social innovations. An example of this is the creation of a network of links not only between producers, but also between producers and consumers, which is to result in shortening the food chain and increasing sales opportunities. Another social innovation could, for example, include actions aimed at increasing consumer awareness about healthy eating habits and selling high-quality products. Another example could be encouraging farmers to take on the role of energy producers as a source of additional income and to achieve energy independence.

As for organizational innovations, an example could be the implementation of new ways of production or sale management, which should result in increased profit, lower production costs or maximum use of sales opportunities, and modification of work organization - saving time and costs. This is confirmed by the works of experts from the project "Food and Nutrition in the 21st Century - a vision of the development of the Polish food sector in the field - Nutrition and human health. A list was created of recommended technologies, which, due to the high scientific and research potential and intellectual capital, have a chance of implementation and development. The European program emphasizes cooperation with the contemporary consumer in the development of new innovative foods (Koziołkiewicz M., Nebesny E., Krysiak W., Rosicka-Kaczmarek J., Budryn G., Gałązka-Czarnecka I., Libudzisz Z., 2011). Aerni P. (2009) draws attention to similar problems and points out that due to climatic and economic reasons, a significant part of food in the 21st century will not only come from the EU and Poland, but also from outside. This has an impact on the use of innovative production and quality assurance of manufactured products.

The last group of innovations, the so-called technological innovations, can refer to: activities related to the use of new products, changes in the structure of crops or agricultural technology in order to increase income and efficiency

of production, or use of new technologies based on biomass on farms, or energy production as conscious actions for environmental protection (Tabaka, 2015, Wielewska, 2015).

A farmer from Lubraniec who came up with an idea of using solar energy for drying herbs and fruits on his farm seems to be a good realization of the above examples of implementing innovations in rural areas. First, he visited an advisory centre for farmers, then applied for funding from the Rural Area Development Program and received funds for investment. The farmer currently has 100 solar collectors in a 21-hectare farm, working between June and October. As a result of the implementation of this innovative solution, the farm currently uses 40% less coal dust, which in turn translates into the profitability of the agricultural enterprise and has a positive impact on the natural environment (www.enrd.ec.europa. eu, 2013, p. 25).

Another example can be introduction of SPA services within the framework of agritourism activities, or promotion and implementation of a new form of tourism in rural areas – apitourism (educational tourism, sustainable tourism, attractions and leisure in a beekeeping farm). As part of innovative solutions, an offer is being prepared that is related to beekeeping, honey and bee products; cooperation is established with the beekeeping union, local self-government and agricultural advisory centre, and as a result of the steps, the beneficiary obtains financial resources for creating a branded product or service certified with a common high quality mark (Woś, 2015).

Innovations in apitourism can be, for example, creating a new specific product (e.g. honey with bee pollen and propolis), innovative services (e.g. relaxation massage using a specific type of honey), anti-depression session in the honey-inhalatorium, culinary workshops (e.g. baking honey cake), introducing new packagings, e.g. in the shape of a drop of honey (Woś, 2015). An example of such farms is the "Ulik" apiary in the village of Mokrelipie in Roztocze run by the Śliczniak family, in which there is an educational farm, and the innovative product is bean honey (www.pasieka24.pl).

Now that innovations have been explained, it is worth describing the notion of innovativeness. Also in the case of innovativeness, there is a multitude of definitions as well as different aspects of addressing this issue. Innovativeness is expressed in the ability of economies and enterprises to create, implement and absorb innovations (Wielewska 2017). Often, innovativeness is identified with the implementation of new solutions in a given environment, which in turn should be considered in a narrower and wider context (Król, 2017).

Another definition states that innovativeness is the realization of creativity in organizational processes, products or technologies, (Szczepańska-Woszczyna,

2014) and how the particular individual acts when implementing novelties (Zakrzewska, Puchalska, Morchat, Mroczkowska, 2010).

As M. Struś and J. Kalinowski rightly point out, the state of innovativeness in rural areas is a resultant of mutual influence and relations between the public sector, entrepreneurs, consumers and farmers. When deciding on the selection and implementation of innovative solutions, farmers must first decide what their priority is: their own interest or the welfare of the public, and likewise: increase in productivity or sustainable development (Struś & Kalinowski, 2015).

In addition to the aforementioned dilemmas, there are also a number of barriers that inhibit the growth of innovativeness in rural areas. First of all, it is an anxiety of change, novelty and the unknown and a relatively small percentage of people with pro-innovative attitudes. Secondly, an aging population and a lower percentage of rural residents with college education, as compared to cities. Thirdly, the key barriers to innovativeness include the underdeveloped national health care and rehabilitation system. The rather poorly developed infrastructure in rural areas is also of significance.

To sum up, the population living in rural areas undoubtedly needs various forms of incentives, training and financial support, so that they can actively engage in innovation implementation processes.

6   Instruments of rural area development with particular emphasis on innovation support

When mentioning rural development instruments, the authors will refer to key strategies, initiatives, programs and agricultural policies, under which various forms of support for increasing the innovation of individual regions are offered. For example, the "Innovation Union" should be mentioned – an initiative implemented under the Europe 2020 Strategy (a strategy for intelligent, sustainable and inclusive development adopted in 2010 by the European Commission to stimulate the development of a knowledge-based economy in the EU,) the Lisbon Strategy) (www.stat.gov.pl). The "Innovation Union" focuses on the implementation of four key objectives:

1. Strengthening the knowledge base in Europe (improving the quality of education, developing competences, promoting the European Institute of Innovation and Technology).
2. Implementation of ideas for innovative products (co-financing for companies, creating a common innovation market).

3. Eliminating social and economic disproportions (intelligent specialization of regions, higher social benefits, social innovations and an increase in the role of the public sector).
4. Accumulating resources for groundbreaking projects or the European Innovation Partnership.

The key instrument in the implementation of the "Innovation Union" initiative is the "Horizon 2020" program offering support and funds for research and investment. It focuses on the implementation of three priorities – creating a perfect scientific base (access to world-class scientific research, development of intellectual capital and research infrastructure), improving the attractiveness of Europe as a place for investment in research and innovation, with particular emphasis on eco-innovation and innovation growth in SMEs (a leading position in industry) as well as facing social challenges. The superior objective of the Horizon 2020 program is sustainable development, which is to help meet the challenges in such areas as: food security, sustainable agriculture, marine research, ecological economy for climate or effective management of raw materials (Nowakowska, 2014).

The future Common Agricultural Policy (CAP) (Castellano, 2017) also deals with issues that are particularly important from the point of view of rural development. Its main aim is to increase the competitiveness of agricultural households and sustainable development, while innovation is seen here rather as an element that ensures cohesion of these two areas. Under the CAP, a number of instruments are used, such as direct payments (financial assistance for small farms and young farmers related to production), greening (support of practices that are beneficial for the climate and the environment – diversification of crops, permanent grasslands, ecological areas) (Nowakowska, 2014).

Support for rural development by the European Agricultural Fund for Rural Development (EAFRD) in the second pillar of the CAP focuses mainly on measures aimed at restructuring, investments and modernization of agriculture, by offering support for small farms and the development of organic farming. (Nowakowska, 2014).

The Rural Development Program for 2014-2020 focuses on supporting the implementation of six priorities in the aspect of increasing innovativeness:

1. Facilitation of knowledge transfer and innovation in agriculture, forestry and in rural areas.
2. Improving the competitiveness of all agricultural sectors and increasing the profitability of agricultural households.
3. Improving the organization of the food chain and promoting risk management in agriculture.

4. Restoring, protecting and strengthening ecosystems dependent on agriculture and forestry.
5. Supporting the efficient management of resources and the transition to a low--carbon and climate change-resilient economy in the agricultural, food and forestry sectors.
6. Increasing social inclusion, reducing poverty and promoting economic development in rural areas.

Some of the activities of RDP 2014-2020 ought to be mentioned here, in which there are preferences for innovativeness when considering applications. These activities include, among others, help for young farmers in establishing a business, development of small farms, modernization of farms, processing and marketing of agricultural products, creation of producer groups and organizations in agriculture and forestry.

Under the RDP 2014-2020, the "Cooperation" action is implemented, the beneficiaries of which are operational groups – groups of farmers, businesses established under the SIR (National Network for Innovation in Agriculture and Rural Areas), whose goal is to implement projects in the field of new products, practices, processes, technologies, methods of organization or marketing in the agricultural, food and forestry sectors (Tabaka, 2015).

An important role in the intermediation and participation in the creation of these operational groups (merging of partners) is played by new entities, the so-called innovation brokers (agricultural advisors). Therefore, their key tasks include providing and facilitating the flow of information and establishing cooperation in the field of innovation between the agricultural-food sector, science-research sector and advisory (Nowakowska, 2014).

7   Conclusion

In conclusion, the development of human capital and care for its quality as well as the related increase in innovativeness in rural areas is the primary goal of EU member states' policies, but not only. It can be seen in various types of newer and newer solutions and implemented projects as well as in the number of institutions participating in their implementation. The development of human capital and increasing the innovativeness of rural areas is in the center of attention of both local governments, as well as non-governmental institutions and foundations. More and more attention is paid to the needs and problems of various social groups in rural areas, such as senior farmers. In the face of an aging population, the effective use of the potential also becomes a big challenge within this group.

As part of improving the quality of human capital and the innovativeness of rural areas, not only financial assistance but also widely developed advisory are available. In the course of recent years, a certain increase in the innovativeness of the country can be seen. The amounts of money spent every year from the EU and other funds as well as the changing image of the Polish countryside confirm a certain extent of success in the area of human capital development.

In a globalized world, in a knowledge-based economy, it is difficult to imagine not using human capital or not implementing innovative solutions in any branch of the economy.

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AGRI-ENVIRONMENT AND CLIMATE ACTION AS AN INSTRUMENT TO PROTECT THE DIVERSITY OF POLAND'S LANDSCAPE

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Abstract

The purpose of this article is to analyze the use of EU funds by national benefi-ciaries as part of their participation in the "Agri-environmental-climate" action im-plemented in seven climate packages, ie Sustainable Agriculture, Soil and Water Conservation, Orchard Conservation of Traditional Fruit Trees, Valuable Habitats and Endangered Species Birds in NATURA 2000 areas, precious habitats outside the NATURA 2000 areas, preservation of endangered genetic resources of plants in agri-culture and preservation of endangered genetic resources of animals in agriculture. The research material is data originating from The Agency for Restructuring and Modernisation of Agriculture (ARMA) concerning applications submitted by farms. Calls for proposals were held from March 15, 2014 till June 10, 2016. The object of the research was an analysis of the activity of Polish applicants. The article uses the descriptive and tabular method of statistical data analysis. In addition, the purpose of the analysis was to analyze the literature of the subject. Agri-environmental and climatic action as an instrument for the protection of landscape diversity is an im-portant support instrument for Polish farmers. Since the beginning of Poland's acces-sion to the EU in 2004, Polish farmers are aware that agricultural activity should be

conducted in accordance with sustainable development, and CAP agri-environment and climate programmes are an instrument whose aim is to preserve environmental and climate biodiversity. Such programmes should be supported as they bring benefits to farmers themselves in the form of subsidies (money) and the environment in the form of protection of natural ecosystems and sustainable development.

Keywords: *Agri-environmental-climate, the Common Agricultural Policy, European Union*

JEL classification: *Q10, Q14, Q19, Q18*

1.Introduction

Poland's membership in the European Union and the acquisition of Polish agriculture by the mechanisms of the Common Agricultural Policy and the specific nature of rural areas in Poland represent a major challenge for farmers for whom the proper use of aid is the most important issue in the drive for diversification of farm activities in this area and competition in the common European market in accordance with the principles of sustainable development (Kania, Bogusz 2011, Paluch, Płonka 2016, Wojcieszak 2016).

One of the key objectives of the Common Agricultural Policy is to promote environmentally friendly agricultural practices (Palsova 2015). Agri-environmental and climatic action in the financial perspective of 2014-2020 is an instrument to implement and promote agricultural practices that aim to protect waters, soils, precious natural habitats, endangered species of flora and fauna and protect landscape diversity (Dicks, Kleijn, Batary, Sutherland 2015). Activities undertaken by farmers within this measure have undoubtedly influence biodiversity diversity in the countryside. In addition, compliance with the agri-environmental requirements of the individual packages by the beneficiaries is conducive to the rational use of nature resources and the reduction of the negative impact of agriculture on the natural environment (Lefebvre, Espinosa, Paloma 2012). The essence of this action is the use of payments to compensate for costs and lost revenue, to farmers who voluntarily apply production methods to protect the environment.

2   Data and Methods

Poland's accession to the European Union has made farmers and rural residents the beneficiaries of the Common Agricultural Policy (CAP). As part of rural policy, activities from the Rural Development Program (RDP 2007-2013 and RDP 2014-2020), which are the basic instrument for supporting the structural,

economic and social transformations of rural areas, agriculture and processing of agricultural products, have been implemented in new periods since 2007 programming, inter alia through the implementation of various investment and agri-environmental projects (Bogusz, Paluch 2011; Prus, Wawrzyniak 2008, 2010, Kiełbasa, Grzelak 2014, Kiełbasa 2013, Wojcieszak 2016).

The purpose of this article is to analyze the use of EU funds by national beneficiaries as part of their participation in the "Agri-environmental-climate" action implemented in seven climate packages, ie *Sustainable Agriculture, Soil and Water Conservation, Orchard Conservation of Traditional Fruit Trees, Valuable Habitats and Endangered Species Birds in NATURA 2000 areas, precious habitats outside the NATURA 2000 areas, preservation of endangered genetic resources of plants in agriculture and preservation of endangered genetic resources of animals in agriculture*. The research material is data originating from The Agency for Restructuring and Modernisation of Agriculture (ARMA) concerning applications submitted by farms. Calls for proposals were held from March 15, 2014 till June 10, 2016. The object of the research was an analysis of the activity of Polish applicants. The article uses the descriptive and tabular method of statistical data analysis. In addition, the purpose of the analysis was to analyze the literature of the subject.

3   Results and discussions

Packages under the agri-environmental-climatic measure are mostly continuation of the packages implemented under the agri-environmental program RDP 2007 -2013. However, with the experience of implementing the agri-environmental program, they have undergone some modifications. Organic farming in the financial perspective 2014-2020 is functioning in Poland as two independent actions, which is different from the previous one within RDP 2007-2013, where organic farming was one of the packages of the agri-environmental program.

The essence of agri-environmental-climate action is to promote agricultural practices that contribute to the protection of soil, water, climate, valuable natural habitats and endangered bird species, endangered genetic resources of crops and livestock, and the protection of landscape diversity. Practices applied in the Measure affect biodiversity diversity in rural areas, contribute to the diversity of species and abundance of pollinating insects, and to the habitat of many other animal species.

The support under the measure may be used (Agri-Environmental Action Guide 2016):

- farmer conducting agricultural activity on a farm located in Poland; under the concept "farmer" means a natural or legal person, or a group of natural or legal persons, irrespective of the legal status of such group and its members,
- land manager - entity (natural person, legal person, group of natural or legal persons) farming in natural areas, ie non-agricultural land, on which there are certain types of natural habitats or bird nesting habitats
- group of farmers or group of farmers and land managers.

Table 1 **Characteristics package and variants**

Package	Variants
Pack 1. Sustainable farming	
Pack 2. Protection of soils and waters	2.1. Catch crops
	2.2. Protective belts on slopes with a slope above 20%
Pack 3. Preserve orchards of traditional fruit tree varieties	
Pack 4. Valuable habitats and endangered bird species in Natura 2000 areas	Protection of natural habitats:
	4.1. Varied wet meadow meadows
	4.2. Selenite meadows and sunflowers
	4.3. Grasslands
	4.4. Wet meadows
	4.5. Semi-natural fresh meadow
	4.6. Peat bogs
	4.6.1. Peat bogs - mandatory requirements
	4.6.2. Peat bogs - compulsory and supplementary requirements
	4.7. Extensive use in special protection areas (SPAs)
	Protection of bird breeding habitats:
	4.8. Protection of nesting habitats for birds: ryegrass, duckweed, bloodworm or lapwing
	4.9. Protection of breeding habitats of birds: Aquatic Warbler
	4.10. Protection of nesting habitats of birds: dubelta or big ball
	4.11. Protection of breeding habitats of birds: corncrake

Package	Variants
Pack 5. Valuable habitat outside the areas Natura 2000	Protection of natural habitats:
	5.1. Varied wet meadow meadows
	5.2. Selenite meadows and sunflowers
	5.3. grasslands
	5.4. Wet meadows
	5.5. Semi-natural fresh meadow
	5.6. bogs
	5.6.1. Peat bogs - mandatory requirements
	5.6.2. Peat bogs - compulsory and supplementary requirements
Pack 6. Preserve at risk genetic resources plants in agriculture	6.1. Preservation of endangered genetic resources of plants in agriculture - in the case of cultivation
	6.2. Preservation of endangered plant genetic resources in agriculture - in the case of seed or seed production
Pack 7. Preserve at risk genetic resources animals in agriculture	7.1. Preserve local breeds of cattle
	7.2. Behavior of local breeds of horses
	7.3. Preserve local breeds of sheep
	7.4. Preserve local breeds of pigs
	7.5. Behavior of local goat breeds

Source: Own study based on data from the Ministry of Agriculture and Rural Development, 2017.

Farmer has a wide selection of 7 packages to choose from the 28 variants are shown in table 1.
Each beneficiary of the Action is obliged to comply with the following requirements (Agri-environmental and climatic guide 2016):
- must have an agri-environmental activity plan,
- must keep a register of agri-environmental activities,
- cannot transform existing permanent grassland on the farm;
- must keep on the farm elements agricultural landscape not used in agriculture, which are the mainstay of nature.

Table 2 **Participation of agricultural producers in agro-environmental and climatic action**

Voivodship	Total number of applications submitted	PACK			
		1	**2**	**3**	**4**
		Sustainable farming	**Soil and water protection**	**Preserve orchards of traditional fruit tree varieties**	**Valuable habitat and endangered bird species in NATURA 2000 areas**
Dolnośląskie	768	40	24	4	325
Kujawsko-Pomorskie	841	542	56	5	152
Lubelskie	1813	390	81	22	524
Lubuskie	476	29	1	1	271
Łódzkie	276	83	20	4	69
Małopolskie	896	14	83	58	267
Mazowieckie	1162	119	112	20	649
Opolskie	106	69	4	0	7
Podkarpackie	1954	61	36	31	850
Podlaskie	1300	90	31	15	829
Pomorskie	1025	373	66	4	213
Śląskie	152	12	15	5	23
Świętokrzyskie	495	85	103	18	170
Warmińsko-Mazurskie	841	154	22	3	347
Wielkopolskie	904	193	136	5	392
Zachodniopomorskie	692	105	15	5	390
SUMMARY	13701	2359	805	200	5478

Voivodship	Total number of applications submitted	PACK		
		5	6	7
		Valuable habitat outside the NATURA 2000 areas	Preservation of endangered plant genetic resource in agriculture	Preservation of endangered genetic resources of animals in agriculture
Dolnośląskie	768	329	15	31
Kujawsko-Pomorskie	841	72	3	11
Lubelskie	1813	582	134	80
Lubuskie	476	159	5	10
Łódzkie	276	60	16	24
Małopolskie	896	208	2	264
Mazowieckie	1162	183	24	55
Opolskie	106	20	0	6
Podkarpackie	1954	896	30	50
Podlaskie	1300	244	10	81
Pomorskie	1025	281	23	65
Śląskie	152	80	4	13
Świętokrzyskie	495	79	24	16
Warmińsko-Mazurskie	841	257	7	51
Wielkopolskie	904	124	14	40
Zachodniopomorskie	692	152	16	9
SUMMARY	13701	3726	327	806

Source: Own study based on unpublished data from ARMA.

By joining the implementation of the measure, the beneficiary, together with the agri-environment adviser, develops a agri-environmental action plan. The plan covers the entire period of the agri-environment-5-year commitment. Contains a description of the farm, specifies what packages (variants) will be implemented, and provides other information about the obligation involved, such as crop rotation, grazing, mowing times.

Applications are submitted to the Agency for Restructuring and Modernization of Agriculture, which acts as a payment institution in Poland, as part of the activities of the Common Agricultural Policy.

Based on the analysis of data obtained from the Agency for Restructuring and Modernization of Agriculture, it can be concluded that the activity of Polish farmers was very different (Table 2). Farmers from Lubelskie voivodship (13.23%), podkarpackie (14.26%), podlaskie (9.49%), Mazowieckie voivodships (8.48%) were the largest share of applicants for payment under the agri-environmental- , Pomorskie (7.48%), Kujawsko-Pomorskie (6.14%), Lesser Poland (6.54%), Warmińsko- Mazurskie (6.14%), Wielkopolska (6.60%), Lower Silesia (5, 61%) and West Pomerania (5.05%).

Less than 5% of requests came from the following voivodeships: Świętokrzyskie (3.61%), Silesian (1.11%), Łódź (2.01%), Lubuskie (3.47%). Very little interest was shown by farmers from Opolskie Voivodship (0.77%). It may be presumed that such a situation was due to insufficient knowledge among farmers, poor promotion, or farmers' concerns regarding fulfillment of the requirements during the implementation of the action.

In addition, applicants are most likely to submit applications under Package 4, ie, Habitats and Endangered Bird Species in NATURA 2000 [Number of Submissions 5 478], Package 5 - Valuable Habitats Outside NATURA 2000 Areas [Number of Applications Received 3 726] and Package 1 - Sustainable Agriculture [number of applications submitted 2 359]. It can be assumed that such high interest on the part of farmers was mainly due to the high rate of payment for the given package. For example, in the case of sustainable agriculture, the rate of payments per hectare was 2015. - 400 zlotys. In the case of the fourth package, the payment per hectare was in the range of PLN 600 to PLN 1276 [depending on the bird species conservation project]. Preserving orchards of traditional varieties of fruit trees is a package that Polish farmers were least interested in. Only 200 agricultural producers submitted applications for this project, despite the fact that the payment per hectare was high and amounted to PLN 1964 [in 2015].

It was noted that among the applicants, male applicants were 87.04% male. The above situation may be the result of an entry into the Register of Manufacturers (EP), which takes place in ARMA District Offices. Bearing in mind the legal form, it was stated that individuals showed great interest. A small share was made up of legal entities and organizational units without legal personality.

It was noted that men representing 87.04% dominated among the producers submitting applications. The above situation may be the result of an entry in the Register of Producers (RP), which takes place at the District Offices of ARMA. Bearing in mind the legal form, it was found that natural persons showed great interest. Only legal persons and organizational units without legal personality constituted a limited share.

Table 3 **The rate of success in receiving EU funds under the Agro-environmental-climate program [decision positive-payment]**

No	Voivodship	Success rate [%]
1.	Dolnośląskie	73
2.	Kujawsko-Pomorskie	62
3.	Lubelskie	94
4.	Lubuskie	99
5.	Łódzkie	84
6.	Małopolskie	60
7.	Mazowieckie	80
8.	Opolskie	70
9.	Podkarpackie	75
10.	Podlaskie	73
11.	Pomorskie	88
12.	Śląskie	85
13.	Świętokrzyskie	89
14.	Warmińsko-Mazurskie	83
15.	Wielkopolskie	89
16.	Zachodniopomorskie	93
	Average in Poland	82

Source : Own study based on unpublished data from ARiMR [as of 06/07/2017].

Due to the fact that the applications for the "positive decision-payment" status constitute a high percentage in relation to the total number of applications submitted as part of the analyzed activity in the audited period, the success rate was presented (Table 3). When examining positively considered applications, it should be noted that the success rate in the analyzed period was 82% for Poland. For a more detailed explanation, the voivodships were compared according to the success rate in relation to the agri-environmental-climate action. The analysis allowed to indicate voivodships with the highest success rate (over 90%). These were the following provinces: zachodniopomorskie, lubuskie and lubelskie. In these voivodships, the greatest interest from farmers was noted and the majority of applications were positively examined. Definitely the lowest success rate was recorded by farmers applying for funds from the Małopolska province (only 60%) and Kujawsko-Pomorskie (62%). The remaining voivodships oscillated at the level of 73% [Dolnośląskie and Podlaskie Voivodships] to 89%, including the

Wielkopolskie and Świętokrzyskie Voivodships. It should be emphasized that the beneficiaries from the Podkarpackie, Podlasie and Pomeranian provinces showed high activity [number of submitted applications] in acquiring EU funds, however, some of them due to non-compliance received a negative decision and funds were not granted or were granted in a reduced amount . It should also be pointed out that the high level of financial resources received in these voivodships (Figure 1) is due to the fact that farmers participated in the packages for which the subsidy was the largest, hence the high level of funds in a given province.

Figure 1 **The amount of support [PLN] provided in individual voivodships within the analyzed ctivity**
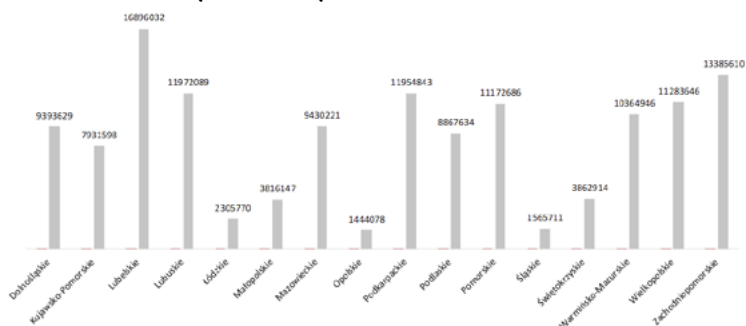
Source: Own study based on unpublished data from ARiMR.

There were differences in the amount of funds raised by agricultural producers in the system of voivodships. To determine the regional variation, it is important to determine the relationship between the value of submitted applications and the total number of farms within the voivodship, which makes it possible to make comparisons. Analyzing the average value of financial aid granted to beneficiaries who submitted an application under the agri-environmental-climate action, it was found that it varied depending on the region and the package in which the farmer participated. Analyzing the aspect regarding the payment of financial resources (Figure 1), it can be seen that farmers from the Lubuskie Voivodeship received a financial envelope in the amount of over PLN 16 million, then beneficiaries from the West Pomeranian Voivodeship over PLN 13 million. Producers from the Wielkopolskie, Pomorskie, Podkarpackie and Lubuskie voivodships received financial resources for the amount of over PLN 11 million [each voivodship]. Beneficiaries from the Opolskie, Śląskie and Łódzkie voivodships received a subsidy in the amount of PLN 1 to 2.3 million.

4   Conclusions

Agri-environmental and climatic action as an instrument for the protection of landscape diversity is an important support instrument for Polish farmers. It turns out that farmers see in these programs the development opportunities of their farms, especially in the field of sustainable agriculture. In addition, it should be emphasized that Polish farmers who own their farms in Natura 2000 areas are aware of how valuable natural areas are and are willing to make use of the financial resources of EU aid that are largely targeted at these areas.

In conclusion, it should be stated that from the very beginning of Poland's accession to the EU (2004), farmers are aware that agricultural activity should be carried out in accordance with sustainable development and that the CAP's agri-environment and climate programs only easier.

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POSSIBILITIES AND BARRIERS TO THE DEVELOPMENT OF ECONOMIC ACTIVITIES IN RURAL AREAS ON THE BASIS OF PIOTRKÓW KUJAWSKI COMMUNE (POLAND)

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Abstract

Agriculture of well developed countries is characterized by large size farms, high marketability and mechanization. The demand for labor force in this sector of economy is getting lower and lower. Inhabitants of rural areas need to look for jobs in local companies, go away to other places or set up their own non-agricultural business. A survey was carried out to evaluate the conditions and possibilities of economic activity development in rural areas as well as determine its supportive factors and barriers inhibiting this process. Another important issue was assessment of the role of local authorities in the process of non-agricultural activity development. In order to accomplish the research goals and collect empirical data, a survey method was used involving the questionnaire interview technique. The survey was carried out in May and June 2015, among 110 entrepreneurs of the analyzed commune rural areas – both, those involved in economic activity and farmers involved in non-agricultural activities. The survey provided data concerning non-agricultural activity, which allowed to identify benefits and barriers involved in having own business located in rural areas. Moreover, agricultural farms involved in non-agricultural economic activity have been characterized. According to the respondents, the best way for the local authorities to support the rural area economic development, was to build the required infrastructure, thus providing small and medium companies with

appropriate conditions to develop, and incorporate their operation into the overall development strategy plan for the region.

Keywords: *rural areas, non-agricultural entrepreneurship, multifunctional development of rural areas*

JEL classification: *J43, Q12, Q13*

1 Introduction

In modern times agriculture of well developed countries is characterized by large size farms, high marketability and high mechanization degree. (Brown et al. 2005; van Zanten et al. 2014). This involves reduction of the demand for labor force in this sector of economy (Swinnen et al. 2005), which in turn increases unemployment (White, 2012) Thus, the local inhabitants have to look for employment in local companies or leave the place in search of a job. Starting one's own non - agricultural business (Carter, 1998) that is being a micro-or a small company is another alternative. This solution is most appreciated by the authorities as it contributes to the region economic growth, and attractiveness, unemployment decrease, especially when the new activity goes with a demand for employees.

According to many authors, the economic situation of many rural areas can be improved through turning to alternative income sources, which is inseparably connected with multi-functional development of these areas. This involves skillful implementation of new social and economic functions into these areas (Prus, 2010, p. 15-16; Runowski & Ziętara, 2011; Kalinowski, 2013; van der Ploeg & Roep, 2003) which will contribute to creation of local workplaces and new trade facilities and services (Steiner & Atterton, 2015). Small and medium companies are often characterized by high innovativeness and flexibility and they can effectively use local resources including agricultural products, traditional food recipes (in the case of gastronomy and tourism), and most importantly human resources (Anthopoulou, 2010). This process requires a change in farmers' attitudes and development of entrepreneurship in rural areas (Eliasson & Westlund, 2013; Iagăru et al. 2016; Korpysa, 2010). The inhabitants of rural areas need to be motivated for launching a non-agricultural activity which can contribute to improvement of their living conditions. It is also necessary to get familiar with the factors which have a positive and negative influence on running a business.

The goal of the survey was to assess the conditions and possibilities of economic activity development in rural areas as well as identify the factors that boost and barriers that inhibit the process. Another issue was to define the role of local authorities in supporting non- agricultural activities.

2   Data and Methods

In order to meet the research assumptions it was necessary to get familiar with the opinions of business owners of the analyzed commune whose names were taken from the list of companies situated on the territory of the commune. Documents and materials from the Piotrków Kujawski Town and Community Council were used as a source of information concerning the number of business entities functioning in rural areas of the studied commune. Additionally, in May and June 2015, a survey was carried out among entrepreneurs of the analyzed commune rural areas - including entrepreneurs and farmers who additionally were involved in economic activity. At the time of the survey, 131 entrepreneurs had already been registered, 110 of which were out of service and 21 temporarily suspended. As many as 50 entrepreneurs participated in the survey. The maximal measurement error was 8.5%, with confidence level of 0.90 and the size of population equal to 110 persons. The survey method which was used involved the questionnaire interview technique. The sheet of a questionnaire included total 25 questions, 7 of which were closed questions, 14 half-closed and 4 were metric questions. The survey allowed to obtain data on non-agricultural activities, define benefits and barriers connected with running one's own business in rural areas as well as characterize agricultural farms which are also involved in non-agricultural activity.

Piotrków Kujawski Commune is situated in the south of Kujawsko Pomorskie Province in Radziejów District. It borders with the following communes: Bytoń, Radziejów, Topólka (Radziejów District), Kruszwica (Inowrocław District), as well as Skulsk i Wierzbinek belonging to Koninski District in Wielkopolskie Province. It covers the area of 138.62 km2, divided into 23 offices of the village leader. The commune is inhabited by 9426 persons, 4964 of which (52.7% of the population) are residents of rural areas (Informator, 2009, p. 12; Główny, 2015; Serwis, 2013). Piotrków Kujawski Commune is a typically agricultural commune where arable lands account for 82% of the area. It is characterized by good conditions for development of commodity agriculture, ecological agriculture, as well as vegetable cultivation. The main kinds of cultivation are crops, corn for silage, sugar beets, rape and ground vegetables. On the territory of the commune there are more than 1000 agricultural farms. Many of them specialize in dairy and beef cattle and pigs. Moreover, there are 885 ha of forests on the territory of the commune which account for 4% of the commune area. (Informator, 2009, p. 3-4; Serwis, 2013).

The majority of the respondents were men (78.0%), whereas women accounted for 22.0% of the respondents. Considering the age of the surveyed group, it can be observed that most of the persons who were involved in economic activity on the territory of Piotrków Kujawski Commune, were young persons – 40.0% of the

respondents were at the age of 30 and 39 and 28.0% below 29. The second most numerous group, included persons aged 40-49, which accounted for 22.0% of the respondents. Older people aged 50-59 accounted for 8.0% of the respondents and those aged over 60 – 2.0% of the respondents, represented the smallest group of people who decided to set up a business. Considering education of the surveyed population, 44.0% of the respondents were high school graduates, whereas 40.0% were graduates of vocational schools. 16.0% of the respondents were university graduates. Another issue was being an owner of an agricultural farm. A great majority of the respondents (68.0%) were involved only in economic activity. The next 10.0% did not have an agricultural farm, but they rented it, whilst their main source of income was a non-agricultural economic activity. Only 22.0% of the farmers declared having an agricultural farm and being involved in additional economic activity.

3   Results and Discussion

The decision to start a business is conditioned by many factors including those which boost economic activities (Begley et al. 2005; Bienkowska-Golasa, 2015; Dobeš et al. 2017; Sikora & Bielski, 2017) and those which inhibit them. According to the respondents, the most beneficial actions that were taken by the local authorities to support entrepreneurship was reduction of taxes on buildings, land and employment (54.0%), as well as reduction of the bank credit interest (42.0%). The respondents appreciated the development of infrastructure (22.0%); supportive policy of the state promoting the sector of small and medium companies (18.0%), increase in the demand for manufactured or offered products or services (16.0%), easier access to preferential credits (14.0%), and an increase in activeness of local authorities in relation to the sector of SMC (6.0%) – the data is included in Table 1.

Table 1 **Factors that affect the development of entrepreneurship in rural areas in the opinion of respondents**

Specification	Number of responses	%
Tax reduction	27	54.0
Credit interest reduction	21	42.0
Infrastructure development	11	22.0
Increase in the government interest in Small and Medium companies	9	18.0
Increase in demand	8	16.0
Easier access to preferential credits	7	14.0

Specification	Number of responses	%
Increase in the commune authorities activeness to support the sector of Small and Medium Companies	3	6.0
Total	**86**	**172.0***

* Sum of responses exceeds 100.0%, because respondents could give more than one response
Source: Own research.

Apart from the factors which are supportive for creation and development of non-agricultural economic activity there are also obstacles to this activity (Meyer et al. 2016; Muhammad et al. 2017; Ryglova, 2007). The respondents are of the opinion that to high local taxes are the biggest obstacles to the development of economic activities (48.0%) and low profitability of the business (34.0%), that is, barriers of economic character (Table 2). Too high standards imposed by the European Union were also indicated (26.0%). Although the possibility of gaining an additional support, including EU funds, is attractive (Dobeš et al. 2017; Murray, 1998; Radicic & Pugh, 2017), it involves the need to comply with rules and conditions set by the EU. In the opinion of the respondents the remaining barriers limiting creation of new businesses were of economic social and organizational character. They include: lack of support (14.0%), lack of promotion on the part of the local market (6,0%), lack of customers interested in new products or services (6.0%) and unfriendly attitude of neighbors or other people toward competition (4.0%). It needs to be noted that 10.0% of the respondents noticed no difficulties in starting economic activity.

Table 2 **Difficulties involved in taking up economic activity in the opinion of respondents**

Specification	Number of responses	%
Too high local taxes	24	48.0
Low profitability	17	34.0
EU standards	13	26.0
Lack of support	7	14.0
Lack of difficulty	5	10.0
Lack of promotion of the local market	3	6.0
Lack of customers interested in the offer	3	6.0
Unfriendly attitude of neighbours/others	2	4.0
Total	**74**	**148.0***

* *Sum of responses exceeds 100.0%, because respondents could provide more than one response*
Source: Own research.

Analyzing the respondents' opinions on the subject of conditions and possibilities of economic activity development in the commune of Piotrków Kujawski it can be observed that its ability to boost economic activities is at a medium level. half of the respondents find it to be average (52.0%), and 26.0% respondents think it is rather high. Only for 8.0% of entrepreneurs the commune conditions for creation of new economic entities are found to be rather poor. In turn 14.0% of the respondents were not able to provide their opinion on this subject (Figure 1). Thus, the survey results show that Piotrków Kujawski Commune can offer rather good conditions for new businesses to be set up.

Figure 1 **Assessment of conditions and possibilities of economic activity development in Piotrków Kujawski commune in the opinion of the respondents (%)**
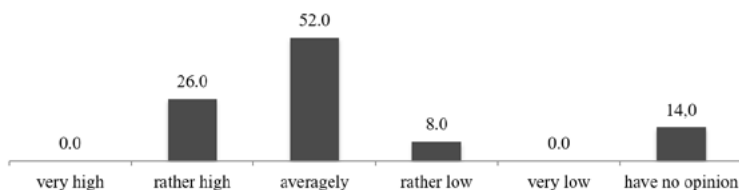
Source: Own research.

Difficulties and obstacles appear not only upon starting a business. They also occur while its functioning (Greening et al. 1996; Knechel, 2007). In the opinion of the respondents it was the financial barrier which most often affected a company operation (42.0%). It leads to low incomes and high production costs or costs connected with purchasing materials and products necessary for the enterprise to keep functioning. Another difficulty indicated by the respondents was a small demand for offered services (38.0%) and existence of competitive facilities (26.0%). According to the respondents other barriers that inhibit functioning of enterprises include: local problems (14.0%) and administration barriers (6.0%), the first resulting from inconvenient location, e.g. too far to be available to customers or offering services inadequate to the demand the latter obstacles result from failure to comply with administration requirements or required terms. It needs to be noticed that as many as 40.0% of the respondents did not notice or did not have any problems with functioning of their enterprises (Figure 2).

Figure 2 **Types of obstacles that can be encountered during running a business according to the respondents (%)**
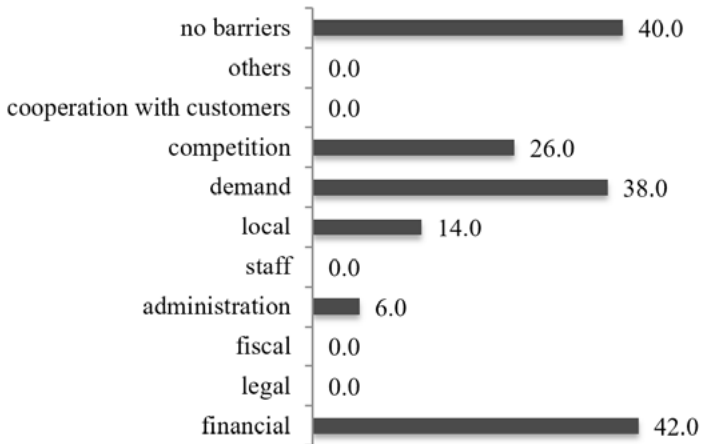
* Sum of responses exceeds 100.0%, as the respondents could provide more than one response
Source: Own research.

In order to encourage development of non-agricultural activity in a given area it is necessary to provide entrepreneurs with favorable conditions of growth (Geroski et al. 2010; Wiklund & Shepherd, 2005). The commune authorities play a very important role in this process (Bienkowska-Golasa, 2015; Johns & Mattsson, 2005). This brings profits both to individual companies, the inhabitants and the entire community, as it contributes to the whole area economic growth. The respondents were of the view that it was the rural areas of Piotrków Kujawski commune whose infrastructure was most invested in by the local authorities (70.0%). Particularly, in the last years the commune authorities put much effort into the local development providing financial means for road repair and restructuring, renovation of public utility buildings or construction of new facilities, according to the local demand. The next 36.0% of the respondents observed that actions of the local authorities to provide good conditions boosting small and medium enterprises. Also investments into social infrastructure were viewed as an increase in the quality of life in a given area. which activate inhabitants of rural areas. Other actions of the local self-government on behalf of non-agricultural activity include: relating the success of Small and Medium companies to the regional development strategy (30.0%), and subsequently to the economic growth. Only 10.0% of the respondents failed to notice any positive actions of local authorities (Table 3).

Table 3 **Actions of local authorities to support non-agricultural activity in Piotrków Kujawski commune according to the respondents**

Specification	Number of responses	%
Infrastructure construction	35	70.0
Creation of appropriate conditions for the development of small and medium companies	18	36.0
Association of the success of small and medium companies with the strategy of regional development	15	30.0
Lack of effective actions	5	10.0
Total	**73**	**146.0***

* Sum od responses exceeds 100.0%, because the respondents could provide more than one response
Source: Own research.

The local self-government can boost economic activities in a given area not only through construction and development of infrastructure (Bienkowska-Golasa, 2015). Another form of support that can be offered is organization of training courses (Prus & Drzazdzynska, 2017), or promotion of entrepreneurship among the inhabitants (Bienkowska-Golasa, 2015). Analyzing results of the survey it can be observed that as many as 62.0% of the respondents did not take advantage of any form of support offered by the local authorities or counseling centers to encourage inhabitants to take up economic activity (Table 4).

Table 4 **Form of support used by the respondents to take up an economic activity**

Specification		Number of responses	%
YES	trainings, courses	3	6.0
	individual counselling	2	4.0
	private counselling forms	0	0.0
	support from the Town and Commune Office	14	28.0
	financial support from Agency for Restructuring and Modernisation of Agriculture (ARMA)	0	0.0
	others	0	0.0
NO		31	62.0
Total		50	100.0

Source: Own research.

Most of the remaining respondents took advantage of the support offered by The Town and Commune Council (28.0%), which involved focusing the attention of the inhabitants to alternative forms of employment outside agriculture, directing attention to the commune population biggest demands (upon taking decisions on the type and form of activity), and supporting people interested in searching for other sources of support and taking further steps to start economic activity. Other forms used by the respondents while undertaking economic activity included participation in different kinds of trainings and courses improving knowledge and qualifications (6.0%) and use of individual counseling (4.0%). According to the respondents, the number of courses in entrepreneurship organized in Piotrków Kujawski Commune was definitely too small as compared to those which refer to the subjects connected with agriculture or related to payments from European Union funds intended to support agricultural production.

The business registration may also be an obstacle that has to be overcome when establishing a company (Klapper et al. 2010). This is the administrative procedure that can make it easy or not. According to the respondents, in Piotrków Kujawski Commune this process is far too much bureaucratic (56.0%). Some respondents needed specialist advice to support completion of the required documents and found the whole process to be too complicated, though now it is possible to register a company online. 32.0% of the respondents were of the opinion that the process of a new company registration is slow and difficult. The remaining respondents found administrative procedures quite easy, though taking a longer time (6.0%) or a shorter time, the registration was believed to be a difficult and complicated process (Figure 3). Opinions of the respondents were diversified. The procedures might depend on the age and/or education of particular applicants and the knowledge of administration procedures.

Figure 3 **Assessment of the business registration process in Piotrków Kujawski Commune according to the respondents (%)**
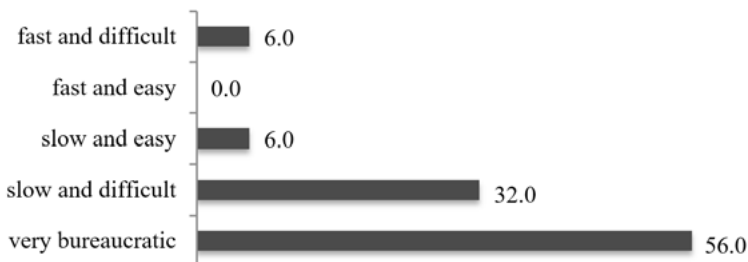
Source: Own research.

4   Conclusions

Small and Medium Companies are a key element of a multi-functional development of the rural areas (North & Smallbone, 1996; Reardon et al. 2007; van der Ploeg & Roep, 2003). Their activity is based on utilization of rural areas resources such as: the location (Cifranič, 2016; Gubáňová et al. 2017), infrastructure (Grimes, 2000), human resources (Faggian et al. 2017; Skuras et al. 2005) etc. Own business is an important source of income and contributes to reduction of hidden unemployment in the rural areas. Insecure situation of agriculture makes farmers and other inhabitants search for other sources of income. Running a business allows to combine both activities. Thus, it is necessary to support this sector of economy as it boosts the local economic growth and is an important element of the national economy.

The survey results show that, among many other factors boosting a launch of one's own business, many respondents listed: decreasing property taxes and taxes connected with employment of workers as well as reduction of bank credit interest. Unfortunately, the respondents were aware of many barriers including: too high local taxes, numerous barriers of economic character (including low profitability of economic activities) and formal-administration obstacles (complicated, time consuming and bureaucratic process of business registration). According to the respondents, the most important investments undertaken by the local authorities supporting non-agricultural economic activity included: construction of infrastructure, providing appropriate conditions for a development of small and medium companies and tying the success of small and medium companies with the strategy of regional growth.

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SMALL FARMS IN POLAND – WHAT IS THEIR PRODUCTION AND ECONOMIC POTENTIAL?

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Abstract

Benefits provided by small farms can be considering in different dimensions: economic, social and environmental. Small scale farming is still present in rural economy of Europe countries. Polish case show that small farms are more often passive participants of food production system, but they are very active when considering obtaining support within Common Agriculture Policy. We can observe decrease number of farms and increase average area of farm in Poland. The basis for the statistical economic analysis was provided by data from the National Agricultural Census conducted in 2002 and 2010, and data show that small farms are in many dimensions weaker than the bigger one. Small scale farms notice low level of modernization and specialization. They tackle with the same problems like bigger farms, but their possibility to maintain production are much more smaller.

Keywords: *production and economic potential, small farms*

JEL classification: *Q12; Q 13, Q 15, Q 18*

1   Introduction

Questions regarding small and large agricultural land holdings have been discussed by economists in Poland since the nineteenth century. At that time, the dominant view pointed to the productive and economic advantages of large estates over small farms (SF). In the 1880s, new theories appeared, the pioneers of which regarded the SF as the optimal form of farming and a non-capitalist way to develop agriculture.

At the beginning of the twentieth century, under the influence of German economists and politicians, two distinct schools of economists and sociologists formed in Poland with divergent views regarding the question of agrarian structure and agricultural reform. On one hand, SF were criticized among other things for their limited ability to make progress, their small-scale production and the associated difficulty in making contact with the marketplace, as well as the low prices they received for their goods. Other researchers, on the other hand, pointed to how small land holdings were better suited to labour-intensive forms of farm production, considering their superior labour supply, lower costs of production as well as their greater resilience in crisis situations (Musiał & Wojewodzic, 2015).

One of the most significant challenges facing the contemporary world is balanced development of agriculture and of rural areas as is balanced food production. The problem of balanced development is growing in importance considering the advancing process of the destruction of the natural environment, the threat to the delivery of public goods, excessive urbanization and the reduction of the health of rural landscapes and of cultural values. In the discussion of the practical possibilities for introducing the concept of balanced agricultural development in rural areas, the question of small farms arises. There are strongly divergent views regarding their importance in shaping balanced development. Supporters of SF indicate that their operation provides many economic, social and environmental benefits in accordance with the principles of the concept of balanced development of agriculture and of rural areas. However, some of the operational shortcomings of SF are apparent, which have economic, social and environmental consequences for the farms themselves, for the development of agriculture and of rural areas, as well as for the economy as a whole.

2 Goals and methods

The goal of this work is to provide an analysis of the productive economic potential of SF in Poland, as well as to indicate their strong and weak points in the context of their contribution to balanced agricultural development and in balanced food production. In this article, was subject to verification was the research hypothesis that from the point of view of the concept of balanced development, SF in Poland do not achieve satisfactory economic results and do not contribute as much to meeting society's demand for food, as would be appropriate for the agricultural resources and other means of production they possess, yet their operation is important on account of the social and ecological role they play.

In order to determine the productive economic potential of SF in Poland, data were used regarding: utilized agricultural area on farms, crop area, animal stocks,

labour input in AWU, farm resources in terms of selected fixed assets, economic size of the farm. Data were used regarding individual farms with a utilized agricultural area from 1 to 5 ha. Adoption of the area criterion as the criterion for definition of what constitutes a small farm resulted in the inclusion in the study of farms that are specialized, but small in area. It should be mentioned however, that analysis of the problem of the state of agriculture and of farms in Poland should consider their area most of all, because it is precisely this which to a large extent is decisive regarding the productive and economic possibilities of many farms today. The exclusion from the group of SF of those under 1 ha in area corresponds to the definition of a small farm applied in the implementation of Common Agricultural Policy in Poland (Rural Development Programme for 2014-2020 [RDP], 2017). The data regarding SF are compared with data regarding large farms, i.e. farms over 5 ha UAA (utilized agricultural area) with the goal of showing their potential in comparison to larger farms. The basis for the statistical economic analysis was provided by data from the National Agricultural Census (NAC) conducted in 2002 and 2010. It should be stressed that the NAC is the most detailed source of data about the situation of this group of farms. Based on the presented data and on studies of the subject literature, a comparison of the merits and the operational shortcomings of SF in Poland in terms of the principles of balanced agricultural development and balanced food production that they meet.

3   Small farms in the European Union and in Poland – problems of definition

In the contemporary literature, the division of holdings is made according to various criteria for their definition and their valorisation, and as a result, the notion of small farm, also called a small holding, is not unambiguously defined (Zegar, 2011). The most frequently used criteria include area of arable land, the amount of output, added value, labour input, the purpose of production or the source of maintenance of the holder. The definition of a small farm usually refers to a farmer in possession of small area of land, with limited resources available, producing goods primarily for self-consumption, and as a result earning a low income from the farm (Narayanan & Gulati, 2002; Sarris & Doucha &. Mathijs, 1999).

In the European Union (EU), many attempts to define small agricultural holdings have been undertaken, but between the Member States or also agricultural sectors there are major differences in this regard. Definitions of a small farm are based, among other factors, on the number of persons working on the farm calculated on the basis of AWU (Annual Work Units) or on the criterion of area, so on the number of hectares in use (UAA – Utilized Agricultural Area). Considering

that employment in agriculture is often of a part-time nature, for a more precise estimate of the number of persons employed on a farm AWU is used, and so the standard labour input unit in agriculture, representing the equivalent of one full-time employee (EU Agricultural Economic Briefs: What is a small farm). By applying this criterion to the definition of SF, one can make use of thresholds expressing a maximum number of AWU. Thus, one can regard as SF for example those on which the annual labour input is small, e.g. at the level of 0.5, 1 or 2 AWU[2].When taking utilized agricultural area into consideration it is most often assumed that SF have less than 2 or, in another formulation, 5 ha UAA. However, use of this criterion to distinguish SF in the EU is flawed, most of all in regard to the great variation between farms in different EU countries.

Another criterion used in the EU for defining SF is economic size. The definition of SF should be based on the actual economic results of the farms (e.g. value of production, net added value or the income produced by the farm). For the purpose of classification of farms by economic size, until 2009 the European Size Unit (ESU) was used. Since 2010, economic size is expressed using the standard output (SO) value in the European monetary unit or euros. The minimal upper threshold of standard output that qualifies a farm for inclusion in the group of subsistence farms in research conducted within the framework of the FADN differ between countries, ranging from 2 to 25 thousand euros (European Commission, 2009).

In Poland, problems with definition appear already in regard to the category of a farm itself. Taking into consideration the criterion of area, it seems that the lower threshold of the area of a small farm should be set at the level of 1 ha. A point for discussion, however, is determining the maximum area of a small farm. A few decades ago, farms with an area between 5 – 7 ha were regarded as medium-sized. Currently, if such a farm is low-intensity and multi-functional, it will be regarded as a small farm. In the future, substantially larger holdings (15 – 20 ha) will be regarded as small, similarly to what is currently the case in some countries of Western Europe (Wilkin, 2013). Some researchers are of the opinion that the upper size threshold for a small farm should be set at 5 ha (Dzun, 2013; Musiał & Drygas, 2013). The arguments for this threshold are also discussed in certain ministerial documents (RDP, 2017).

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[2]   Annual Work Unit (AWU) is calculated as the quotient of the number of hours worked over the course of one year equivalent to one full-time employee. In Poland, 2 120 working hours has been adopted as the equivalent of a full-time employee, i.e. 265 working days at 8 hours of work per day. In accordance with Eurostat methodology, in calculating the labour input expressed in AWU the condition is observed that for one person there may not be more than one AWU, even if in reality the person works longer than that

4   The productive and economic potential of small farms in Poland

Polish agriculture and farms are highly diverse in terms of size when seen from a regional perspective. This diversity is the result of many different factors, be they natural, demographic or economic. In the territorial layout of country, at least three agricultural sub-regions can be distinguished, which are defined based on the area of the farms. The first sub-region is the south-eastern areas of Poland. These areas are characterized by highly fragmented agricultural holdings. There is a high number of SF here, frequently either social or residential in nature, with a small share of medium and large-sized farms. The next sub-region is the central part of Poland as well as the voivodships of Lower Silesia (Dolnośląskie) and Podlasie (Podlaskie), in which the statistically average farm is from around 8 to 16 ha is size. The third sub-region, however, consists of the voivodships located in the western and northern parts of the country, and their area is statistically the largest (Musiał, 2013b). Evidence of the degree of agricultural fragmentation and of farm structure in specific voivodships is provided by the share of SF, i.e. holdings of between 1 – 5 ha utilized agricultural area, as a percentage of the total.

The most important factor of production in agriculture is land. In 2010, there were 2.2 million ha of utilized agricultural area (UAA) in the possession of SF in Poland, which however signifies a decline in the area occupied by such farms by nearly 21% compared with 2002, and the share of such farms in the total UAA owned by individual farms over 1 ha UAA fell from 19.1% to 16.3% (Table 1). The decline in the size of UAA in from 2002-2010 accompanied a reduction in the total number of SF by over 1.1 million to 861.4 thousand, which represents a drop in their numbers by nearly 25%.

Table 1 **Number and area of individual farms over 1 ha UAA according to NAC (PSR) 2002 and NAC (PSR) 2010 data**

Type of farm	Details	2002	2010	Dynamics
Small farms	Number of farms	1146298	861440	75.1%
	Farm area (in ha UAA)	2762998	2187803	79.2%
Large farms	Number of farms	805428	696973	86.5%
	Farm area (in ha UAA)	11698945	11216287	95.9%

Source: Own calculations based on Systematyka i charakterystyka gospodarstw rolnych 2002, GUS, Warsaw 2003, Charakterystyka gospodarstw rolnych 2010, GUS, Warsaw 2012.

Similar tendencies regarding the number of farms and their utilized agricultural area, although with somewhat less intensity, were observed in the group of large individual farms with an area over 5 ha UAA. From 2002-2010, their number declined by 13.5%, and their total area fell by 4.1%. In 2010, the area of large farms constituted 83.7% of the total UAA in the possession of individual farms over 1 ha UAA in size, which represents a growth of their share by 2.8%.

The next phenomenon observed between 2002-2010 was the reduction in the number of farms actually engaged in farming (Table 2). In the group of SF, their number declined by 8.1%. However, the share of these farms in the total number of SF simultaneously rose by nearly 17%, from 75.0% to 91.7%. One can thus conclude that the tendency arose in the group of SF to either take up farming and/or to sell those farm that do not engage in farming.

Table 2 Individual farms over 1 ha UAA in Poland engaged in farming according to according to NAC (PSR) 2002 and NAC (PSR) 2010 data

Details	2002	2010	Dynamics	Share of farms engaged in farming, of the total of the given size class [%]		Share of farms in the total number of farms engaged in farming in a given size class [%]	
				2002	2010	2002	2010
Number of small farms engaged in farming, specifically:	859606	790033	91.9%	75.0	91.7	×	×
- under cultivation	801802	624231	77.9%	×	X	93.3	79.0
- left fallow	82399	110436	134%	×	×	9.6	14.0
Number of large farms engaged in farming, specifically:	758167	690194	91.0%	94.1	99.0	×	×
- under cultivation	740861	646790	87.3%	×	×	97.7	93.7
- left fallow	64354	67433	104.8%	×	×	8.5	9.8

Source: Like in table 1.

It should be stressed, that from 2002-2010 there was a drop in the number of farms that were engaged in farming. Their number fell by 9.0%. However, simultaneously the share of large farms engaged in farming in the total number of large farms grew from 94.1% in 2002 to 99.0% in 2010, and so by nearly five

percentage points. From 2002-2010, the relatively largest decrease in area under cultivation was among SF, which fell by 15.0%. This means that the reduction in the productive potential of SF, because part of their holdings ceased to be their own property, and another part fell into the category of fallow land. The decline in the area under cultivation by SF applied to all of the most important arable crops, whereby the largest relative reduction was in the area of potato cultivation (58.4%), outdoor vegetables (37.9%) and strawberries (28.1%). An exception here was the cultivation of industrial crops, which increased more than twofold. In 2010, most SF, like large farms, cultivated grain and potatoes (Table 3). From 2002-2010 one can observe a drop in the share of the area of SF in the total area under cultivation by farms over 1 ha UAA from 13.9% to 12.3%.

Table 3 Crops on farms over 1 ha in size engaged in agriculture according to NAC (PSR) 2002 and 2010

Type of crop	Year	Percentage of small farms cultivating the given crop [%]	Percentage of large farms cultivating the given crop [%]	Crop share in the cultivated area of small farms [%]	Crop share in the cultivated area of large farms [%]	Share of the total number or the UAA of farms over 1 ha UAA			
						Small farms		Large farms	
						Share of the number of farms [%]	Share of area [%]	Share of the number of farms [%]	Share of area [%]
Grain	2002	62.6	90.1	29.5	50.0	36.8	13.1	37.2	86.9
	2010	64.8	89.6	32.7	47.7	35.8	13.0	40.1	87.0
Potatoes	2002	53.4	77.5	6.1	4.2	31.4	27.1	32	72.9
	2010	35.8	50.3	3.1	2.2	19.8	23.5	22.5	76.5
Industrial crops	2002	1.6	14.6	0.5	4.1	0.9	2.8	6	97.2
	2010	3.0	14.9	1.2	6.5	1.7	3.9	6.7	96.1
Edible legumes	2002	1.4	2.8	0.2	0.3	0.8	13.6	1.2	86.4
	2010	1.1	2.3	0.2	0.3	0.6	12.8	1.0	87.2
Outdoor vegetables	2002	17.7	23.6	1.1	0.9	10.4	23.5	9.7	76.5
	2010	5.0	6.8	0.8	0.9	2.7	16.8	3.0	83.2
Covered vegetables	2002	1.2	1.4	0.1	0.02	0.7	43.8	0.6	56.2
	2010	0.6	0.7	0.1	0.02	0.4	39.7	0.3	60.34
Strawberries	2002	5.5	8.9	0.3	0.2	3.3	31.5	3.7	68.5
	2010	2.7	4.3	0.3	0.2	1.5	23.4	1.9	76.6

Source: Like in table 1.

On individual farms, between 2002-2010 a trend was also observed toward a reduction of the percentage of small and large farms keeping animals (Table 4). The reduction in animal stocks on SF applied to all the basic types of farm animals, whereby the greatest relative reductions were in stocks of cows (56.6%), domestic fowls (41.5%) and swine (37.5%). The reduction in animal stocks on large farms also applied to all the most important types of animals, with the greatest relative reductions were in swine (22.3%), sheep (19.1%) and goats (18.8%). An exception here were cow stocks, which grew by 1.5%. Comparing the size of stocks held on large and SF, it must be noted that most animals are held on individual farms over 5 ha UAA in size. In 2010, the numbers of swine, cows, and sheep there were respectively 14-times, 13-times, and 3-times greater than on SF. Analysis of these data allow the conclusion that the significance of SF in animal production is minor.

The next factor of production that shows the potential of agriculture is labour, which is an active factor with an important influence on the area and the form of use of land and capital resources. The productivity of labour resources describes the productive potential of agriculture, and also has an influence on its internal and external competitiveness. Decisive for this productivity is the quantity and quality of labour resources, as well as the remaining factors of land and capital. Because of the relatively large share of part-time employment as well as seasonal employment of agricultural workers, labour input is expressed in Annual Work Units (AWU).

Table 4 Farms engaged in agriculture over 1 ha UAA in size keeping animals, according to NAC (PSR) 2002 and 2010 data

Type of animal	Year	Percentage of small farms with animals [%]	Percentage of large farms with animals [%]	Animal stocks on small farms [no.]	Animal stocks on large farms [no.]	Share in the total number or in animal stocks of farms over 1 ha UAA in size			
						Small farms		Large farms	
						Share of the number of farms	Share of stocks [%]	Share of the number of farms [%]	Share of stocks [%]
Cows	2002	26.8	66.1	418 882	2280205	15.8	15.5	27.3	84.5
	2010	14.0	46.3	181 817	2314443	7.7	7.3	20.7	92.7
Swine	2002	19.9	61.8	1390231	15697444	11.7	8.1	25.5	91.9
	2010	12.8	39.7	868591	12196026	7	6.6	17.8	93.4
Sheep	2002	0.6	1	72403	223646	0.3	24.5	0.4	75.5
	2010	0.7	0.7	55620	181040	0.4	23.5	0.3	76.5
Goats	2002	2.8	2.4	82939	64811	1.6	56.1	1	43.9
	2010	1.6	1.2	51180	52617	0.9	49.3	0.5	50.7
Domestic fowls ('000)	2002	38.5	60.6	54410	86055	22.6	38.7	25	61.3
	2010	37.0	49	31835	75609	20.4	29.6	21.9	70.4
Horses	2002	7.9	8.9	112169	193716	4.6	36.7	5.2	63.3
	2010	4.8	7.7	72578	172616	2.68	29.6	3.44	70.4

Source: Like in table 1.

Table 5 thus presents the data for labour input in the operation of agricultural activities on farms over 1 ha UAA in 2010. This amounts to a total of 1 843 thousand AWU. On SF, this came up to over 718 thousand AWU, which constitutes 39% of the total labour input on farms over 1 ha UAA. In calculating the labour input in AWU for one farm in a given size group, one must note that agricultural activity on a small farm required the employment of 0.8 persons on average (converted into full-time employees in AWU), and on large farms, 1.6 persons. When analysing the labour input in AWU per 100 ha UAA, one must note that SF employed on average over 32.8 persons per 100 ha UAA (converted into full-time employees in AWU), and so nearly three times as many as a farm over 5 ha UAA in size. Such high values for this indicator on the one hand may result from the peculiarities of type of agricultural production (e.g. such labour-intensive forms of production as gardening or raising vegetables), and on the other are a symptom of a serious problem in Polish agriculture, namely that of disguised unemployment.

Table 5 **Labour input in AWU on individual farms by selected size groups, 2010**

Detail	Small farms	Large farms
Labour input in AWU	718127	1124862
Labour input in AWU per farm	0.8	1.6
Labour input in AWU per 100 ha UAA	32.8	10.0

Source: Own calculations based on Pracujący w gospodarstwach rolnych, GUS, Warsaw 2012.

An important factor of production in agriculture is capital, which makes rising agricultural production possible despite the decline in employment in agriculture or also the reduction in land resources. Resources of real capital on a farm consist above all in ownership of buildings and structures, agricultural machines, technical equipment, tractors and means of transport. An important role should be ascribed to farm technical equipment, which facilitates the production process and provides a substitute for physical labour (table 6).

Table 6 **Selected characteristics of fixed assets available to individual farms engaged in agricultural activity**

Type of machine	Share in the total number of machines of a given type		Number of machines per 100 ha UAA	
	Small farms	Large farms	Small farms	Large farms
Tractors	37	63	18	9
Combined cultivators	26	74	19	7
Combine harvesters	6.5	93.5	0.8	1.7

Source: Own calculations based on Charakterystyka gospodarstw rolnych, Powszechny Spis Rolny 2010, GUS, Warsaw 2012.

Statistical data regarding farm equipment in capital goods show that a substantial part of farm machines on farms over 1 ha UAA were at the disposal of larger farms, i.e. those over 5 ha UAA in size. SF, from 1 – 5 ha UAA in size, owned only 37% of the total number of tractors, 26% of all combined cultivators and 6.5% of the total number of combine harvesters. Taking into account the utilised agricultural area held by SF, it should be stated that for every 100 ha UAA in the possession of such farms there are on average 18 tractors and 19 combined cultivators, while for farms over 5 ha UAA these relations change to 9 and 7 respectively. Because only a small portion of SF possess high-yield combine harvesters adapted to working large fields, the value per 100 ha UAA was not quite 1.

The large number of farms in Poland and the associated faulty agrarian structure, as well as the large number of family members engaged in farm work, have negative effects on the economic viability of farms and on the possibilities for farm household income. Because of methodological differences in the calculation of the economic size of farms in ESU and SO, it is not possible to directly compare the classification of farms by economic size for 2002 and 2010. Table 7 thus presents data regarding farms by economic size class in 2010.

Table 7 **Share of farms by economic size class in 2010, in [%]**

Detail	Economic size class in EUR '000			
	0 - 4	4 - 8	8 - 15	over 15
Small farms	82.9	13.2	2.6	1.3
Large farms	15.0	24.5	25.1	35.4

Source: Own calculations based on Pracujący w gospodarstwach rolnych, GUS, Warsaw 2012.

In analysing the data regarding the percentage of farms by economic size class, it should be mentioned that in 2010 nearly 83% of SF were in the smallest economic size group and thus those with an economic size less than 4 thousand euros, while for farms over 5 ha UAA, this percentage was only 15%, thus more than 5.5 times lower. In 2010, only 1.3% of SF were in the group of farms with an economic size over 15 thousand euros, a percentage 27 times lower than in the case of large farms. The above data portray thus the economic weakness of farms from 1-5 ha UAA in size in comparison to those with greater acreage at their disposal. SF in Poland mainly produce food for their own consumption. In 2010, among the farms that produced agricultural products mainly for self-supply, over half had an area of under 2 ha UAA, and 80% did not exceed 5 hectares in size.

5 The contribution of small farms to balanced agricultural development and balanced food production

The principles of balanced development of agriculture and rural areas were outlined at the United Nations Conference on the Environment and Development in Rio de Janeiro in 1992, the result of which was acceptance of the Agenda 21 action plan, which presents the manner for the development and implementation of a plan of balanced development into economic practice. Regarding rural areas, this conception postulates simultaneously the aspiration to improve the living conditions of the human population and to raise economic activity in those areas, without disturbing rural resources such as the natural environment, the rural landscape or cultural heritage. For such development to occur, an essential condition is the preservation or expansion of environmental resources, as well as economic and social capital in such a way that income levels and the quality of life of farmers and other rural residents would be comparable between present and future generations (Żmija, 2014).

Creation of such a path of development in agriculture does not lead to degradation of the natural environment. Moreover, it allows the application of appropriate technologies and the preservation of soils, water resources, plants and animals (European Commission, 2012).

One of the fundamental benefits that result from the operation of SF is the fact that they supply farm families with sustenance, and their productive activity also leads to earning an income. These farms create, although not always efficiently, employment for individual family members. This is particularly important in areas with relatively high levels of unemployment or limited access to markets

offering non-farm employment. As a result, many SF are not able to survive from agricultural activity alone, they may use their farm infrastructure for other activities and thereby acquire an alternative source of income (Żmija, 2016). The operation of SF is also linked with obtaining benefits in the form of various kinds of rents, and so the extraordinary benefits that accrue from the ownership, administration, use or leasing out of land. In the context of the use of land for agricultural production or also of it being left fallow, especially in areas with a highly fragmented agrarian structure, the first differential rent is important, which is associated with the quality of the farmland used. Farmland of a better class more often provides a rent, and so a surplus above the costs incurred. Farm rents therefore determine how a farmer will use the land (Musiał, 2013a).

The operation of SF offers protection of the local rural population from exclusion from the labour market, because typically even the small productive activity of these farms brings about a reduction in the need for social help from institutions and from family members. SF producing even only for their own needs contribute to the prevention of extreme poverty by providing families with sustenance and income. Possession of even a small farm ordinarily entitles the holder to special social privileges such as inexpensive social and health insurance, and the availability of such support is important, given the fact that the income level and standard of living of small farming families is usually lower than that of commercial farmers or of those employed in other economic sectors. These factors are particularly important in areas with a high level of unemployment, where the non-agricultural sector is only poorly developed. SF and the people working there also constitute a reservoir of labour for other branches of the economy, and in the event of an economic crisis, they provide a buffer ameliorating the worst, above all unemployment. SF also play a cultural role in the preservation of traditions and folk customs, and in the production of regional products (Bukraba-Rylka, 2012). They are a place where the next generation can learn how to manage farm resources and practical skills passed on from one generation to the next within the family structure. Decentralization of rural property creates more fair economic opportunities for rural residents, and has the effect of building the social capital of rural residents. The use of by small farmers of goods and services from local firms supports local community. SF can also contribute to ecological benefits through: the conscious choice of public goods in the form of preserving biodiversity and a diverse rural landscape, engaging in agricultural activity that is environmentally friendly and takes animal welfare into account, preservation of the viability of problem areas, e.g. areas, with unfavourable operating conditions or in peripheral areas.

They are the embodiment of diversity in property and cultivation systems, landscapes, biological organization, culture and tradition. The associated diversity of farm structures contributes to the preservation of biodiversity and of the rural landscape. Small farmers use various technologies and types of cultivation and farm systems. Their labour-intensive practices such as fertilization, organic farming, terracing, composting and recycling of organic products has a positive influence on soil quality and its conservation, which is important in the situation of the reduction of non-renewable resources. The growing environmental consciousness in society means that consumers are coming to appreciate in ever greater measure the exceptional virtues of food produced by SF (Dudzińska & Kocur-Bera, 2013). Those opposed to the maintenance of SF point to the necessity of eliminating them so that their resources can be used more efficiently by farms showing more growth. Most frequently listed as fundamental operational shortcomings of SF are: small scale of output, low income, low ability to compete in the marketplace, inefficient use of land resources and reluctance to join farmland, lack of motivation to expand and modernize farms.

In free market conditions as well as advancing globalization, SF, because of their small-scale production, low capital resources and difficulty in accessing market outlets, are in a deteriorating competitive position on the market, even on local markets. This is why the percentage of households whose main form of family maintenance comes from agricultural production is constantly declining. Operators of SF and their families often to not live from agricultural production, but somehow live on the farm. A large portion of small farm operators see no prospects or the need to develop their farms. The income they earn is primarily from wage labour, and not from non-farm business activity that would use the farm's infrastructure (Halamska, 2011). In many cases, these are no longer farms in the true sense of the word, but auxiliary farms, oriented toward the benefits that come from owning the land itself, and not from farm production (Dzun, 2013). Financial support provided to SF is often the cause of a lack of motivation to expand the farm's land resources or to modernize it in order to earn a higher income.

In social terms, critics indicate that taking up employment outside of agriculture (often in towns) does not contribute to preservation of the village way of life and work ethic. The dispersion of SF also poses a large problem for the construction of economic infrastructure (e.g. water lines and sewage treatment plants), which may impact the conservation of the natural environment and the quality of life of people in rural areas. From an ecological standpoint, these farms are often poorly up to the task of preserving the productive potential of the soil and

only participate to a small degree in the implementation of agro-environmental programmes.

6   Conclusions

In Poland, there has been a tendency for years toward the reduction of the number of farms and their area, whereby this affects smaller farms to a greater degree than it does large ones. The drop in the number of farms is caused above all by the liquidation of small, usually unprofitable farms with the extensification of production, which is often only done to meet the farm household's own needs. A large group of liquidated farms consists of SF that do not engage in any agricultural activity. Despite the drop in the number of SF, their share has remained quite large, and their average size has risen only to a small degree. Large farms have greater potential economic strength, represented by resources in land, and this strength has been undergoing systematic expansion. It should be emphasized, however, that the possibilities for expanding the acreage of farms are limited in those areas in which SF predominate. This results from the fact that for these farms, direct payments are a supplemental source of income that is mainly used for consumption. These can thus be recognized to some degree as a factor contributing to the retention of an unfavourable farm structure.

On SF, there is a visible trend toward the systematic reduction of the already very low level of crop production. SF to an ever-lower extent put their land under cultivation, while the area of fallow land is growing. The scale of these processes among large farms is not as substantial. The share of SF in crop production is significantly lower than that of farms with more than 5 ha UAA, which is the result on one hand of the smaller land resources available to them, but also from the fact that they often obtain lower yields than large farms do, and they often give up on crops altogether owing to the unprofitability of raising them.

After analysis of the real capital resources of farms, one can state that SF are well-equipped with farm machinery and, considering the area of utilized agricultural land, there is a relatively large share of fixed assets at their disposal. Use of this machinery on SF is however relatively small in comparison to farms over 5 ha UAA. In the area of labour inputs, it must be stated that SF employ much greater inputs relative to their area. This overstaffing is associated with low productivity, which affects the profits these farms can earn. Thus, a highly unfavourable phenomenon affecting SF is that of disguised unemployment.

An important factor for the development of farms is, on the one hand, the size and quality of the labour supply, while on the other there is the resourcefulness of those who own the farms. It is also important whether the operators of these

farms wish to get involved in the development of their farms or if they see such possibilities. Some small farm operators see no prospects for the development of their farms and obtain a steady income from other sources. They often prefer wage labour over operating a non-farm business that would allow them to better exploit the farm infrastructure.

SF in Poland do not constitute a homogenous group, and not all of them should be supported. Some should be liquidated in view of the fact that they do not fulfil at all or only to an inadequate degree their productive, social, or ecological functions. Thus, they do not fully realize the principle of the concept of balanced development of agriculture and of rural areas. Support of SF should to a greater degree than is currently the case be the result of concrete economic, social, or environmental activities they undertake. This support should therefore be selective and based, for example, on contracts concluded individually with specific farms. These actions could contribute to a large degree to these farms realizing the concepts of balanced development and increasing their contribution to balanced food production.

Acknowledgements

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DIVERSIFICATION OF ACTIVITY OF AGRICULTURAL ENTERPRISES AS AN INSTRUMENT FOR PROVIDING THEIR ECONOMIC SUSTAINABILITY

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Abstract

The main research tasks are: to determine the peculiarities of diversification of agricultural activities of agrarian enterprises and their impact on sustainable development; to specify criteria and indicators characterizing diversification of production activity; to systematize the factors of diversification of agricultural activity of agricultural enterprises and to determine its influence on the formation of indicators of efficiency; to substantiate the strategies of diversification of agricultural activity of agricultural enterprises and to determine its influence on efficiency.

Paper's objective (s). The purpose of the article is to solve the following tasks: to determine the peculiarities of diversification of agricultural activities of agrarian enterprises and their impact on sustainable development; to specify criteria and indicators characterizing diversification of production activity; to systematize the factors of diversification of agricultural activity of agricultural enterprises and to determine its influence on the formation of indicators of efficiency; to substantiate the strategies of diversification of agricultural activity of agricultural enterprises and to determine its influence on efficiency.

Data / Methods. When writing the article, data from official statistics, data from consulting institutes and own researches, scientific works of domestic and foreign authors were used. In carrying out the research, we used the following methods: economic and statistical - in determining the dynamics, structure and performance of the development of production activities; comparative - in assessing the effectiveness of activities and comparing the levels of diversification of production of agrarian products; calculation-constructive - in substantiating the directions of diversification of production for agricultural enterprises. In the article the author calculated the

Herfindel-Hirschman coefficient, the entropy index, the indicators of concentration and diversification of production in agricultural enterprises in Ukraine.

Results In the agricultural sector, there is a process of vertical diversification of capital through the creation of vertically-integrated structures that combine the production, processing and marketing of agricultural products to end users. Calculated values of the entropy and diversification coefficients indicate an increase in trends in the concentration of production both in certain agricultural enterprises (egg and poultry, pigs, dairy cattle), and within the product groups (growing of cereals and industrial crops). The concentration of agrarian enterprises in the production of a particular group of agricultural products increases the risk of economic activity. Thus, in 2016 compared to 2005 there is an increase in the number of agricultural enterprises in 482 farms that specialize in the production of one type of agricultural product; 2 species - at 1574; In 3 types - 867 farms, which is evidence of a reduction in multi-sectoral enterprises. Currently, highly specialized enterprises are engaged in the production of mainly crop production. There is a process of horizontal diversification in the production of grain crops due to the growth of the concentration of corn production on grain and reducing the economic attractiveness of barley cultivation. Constraining factors of the development of unrelated diversification of the enterprises of the corporate sector through the provision of services are: imperfect tax legislation; high level of market saturation; high level of agronomy of machine-tractor fleet of agricultural enterprises, low competitiveness in the price segment, provision of services in specialized enterprises and individuals.

Conclusion The positive influence of diversification of agricultural activities of agrarian enterprises on increasing their efficiency with increasing share of livestock products in the structure of commodity products has been proved. The concentration of productive resources on the production of mono products in the absence of a system of strategic and tactical planning of production leads to an increase in production risk for agricultural enterprises. The study of the processes of diversification of agricultural enterprises should be carried out taking into account regional peculiarities of the development of the industry, the level of use of commodity producers' production potential and risks of production activity.

Keywords: *Diversification, agribusiness, production concentration, business risk, sustainable development.*

JEL classification: *Q 12*

1   Introduction

Current conditions of agricultural development have led to the manifestation of destabilizing factors on the conditions of conducting production and marketing activities and the possibility of expanded reproduction. The effect of which is to reduce the economic stability of agricultural producers. Under such conditions, the need to use commodity producers approach, which involves the development of a sustainable economic strategy and its implementation in the direction of continuous adaptation to environmental factors.

Particularly difficult is the solution of these problems in the agricultural sector of the economy, which is a multi-sectoral and territorially divided system. It is obvious that in this area the development and implementation of a strategy for the development of agrarian enterprises is complicated by a combination of natural and climatic and market variability. In this regard, it is necessary to formulate a system of measures for the diversification of production activities. The could ensure the efficient functioning of enterprises and contribute to the achievement of the strategic guidelines for their development.

2   Data and Methods

When writing the article were used data from official statistics, data from consulting institutes and own researches, scientific works of domestic and foreign authors. In carrying out the research, we used the following methods: economic and statistical – in determining the dynamics, structure and performance of the development of production activities; comparative – in assessing the effectiveness of activities and comparing the levels of diversification of production of agrarian products; calculation-constructive – in substantiating the directions of diversification of production for agricultural enterprises. In the article the author calculated the Herfindel-Hirschman coefficient, the entropy index, the indicators of concentration and diversification of production in agricultural enterprises in Ukraine.

3   Results and Discussion

The economic expediency of production activity diversification is determined by its impact on the economic and financial position of the enterprise. The result of any diversification should be the reduction of risk and the emergence of synergistic effects, especially in the field of finance, which is developing the most dynamically. The effect of diversification depends largely on the choice of directions

(vertical integration, diversification based on existing activities, creation of con-glomerates).

The link between diversification and efficiency should be seen as complex. Af-ter the implementation of diversification efficiency increases because of rational redistribution of production, financial and human resources, but then over time it decreases. The management process becomes more complicated, contradictions in the principles and procedures of development and management decisions in different divisions of the enterprise are revealed.

The situation in the agrarian sector of Ukraine is uncharacteristic for a coun-try with a developed agricultural sector, above all, the presence of imbalances in the development of agricultural sectors. It should be noted that domestic climatic conditions contribute to the production of the main types of livestock products. Therefore, according to our belief, the violation of the proportionality of branch development can be explained by the unevenness of demand.

During 2010-2016, the largest share in the structure of agricultural enterpris-es of agricultural products at the level of specialization is being thrown by the enterprises of the corporate sector of the agrarian economy. They are engaged in growing annual and biennial crops and production of livestock products, mainly meat and egg poultry and pigs (Table 1).

Table 1 **The dynamics of the agricultural enterprises number by the level of specialization**

Year	the cultivation of annual and biennial crops		growing of perennial crops		animal husbandry		mixed agriculture	
	unit	in % total	unit	in % total	unit	in % total	unit	in % total
2010	11092	69,3	518	3,2	2560	16,0	379	2,4
2011	33505	83,9	870	2,2	3022	7,6	1012	2,5
2012	39282	85,5	1070	2,3	2807	6,1	1189	2,6
2013	41131	86,0	1192	2,5	2717	5,7	1217	2,5
2014	38112	86,3	1064	2,4	2459	5,6	1093	2,5
2015	38856	86,5	1121	2,5	2426	5,4	1028	2,3
2016	37999	87,6	1042	2,4	2141	4,9	898	2,1
2016 in % to 2010	342,6	18,3	201,2	-0,8	83,6	-11,1	236,9	-0,3

Source: Author's calculations.

Such imbalance in the development of the economic activity of agricultural enterprises is due to objective and subjective factors. Among them, it is necessary to mention: violation of price parity between crop production and livestock production; for a long time animal husbandry was a financial donor of plant growing as an object of collateral for bank loans; the lack of parity between producers of livestock products and processors that exist in crop production; lack of effective state support for livestock development, especially sub-sectors with a long-term payback period, etc.

The concentration of productive resources on the production and sale of grain crops, mainly corn on grains and sunflower. The over-saturated the domestic market adds to the dependence of agricultural producers on the policy of grain traders. They occupy about 70-80% of the realization structure and increasing the threats of an economic nature.

Most agricultural enterprises have refused to produce such labor-intensive agricultural products as growing vegetables and fruits - in crop production, meat cattle breeding, and sheep breeding.

During 2006-2016 there was a deepening of the specialization of agricultural enterprises. So the share of farms in the corporate sector of the agrarian economy, which specialize in 1 industry, has grown by 6.4 percentage points, indicating an increase in specialization in the agrarian sector of the economy. Positive tendency to increase the number of farms specializing in the production of 2 and 3 types of products (Table 2).

Table 2 **The dynamics and structure of agricultural enterprises for the number of sub-sectors**

Farm groups	Year			2016 in relative indicators to	
	2006	2010	2016	2006	2010
1 branch	4,6	9,9	11,0	6,4	1,1
2 branches	11,2	25,6	33,5	22,3	7,9
3 branches	15,4	21,9	24,2	8,8	2,3
4 branches	16,7	14,7	13,5	-3,2	-1,2
5 branches	17,4	10,5	7,7	-9,7	-2,8
6 branches	14,0	7,3	4,8	-9,2	-2,5
7 branches	9,7	4,9	2,6	-7,1	-2,3
8 branches	5,4	2,5	1,5	-3,9	-1
9 branches	2,9	1,4	0,5	-2,4	-0,9

Farm groups	Year			2016 in relative indicators to	
	2006	2010	2016	2006	2010
10 branches	1,4	0,8	0,3	-1,1	-0,5
11 branches	0,8	0,3	0,2	-0,6	-0,1
12 branches	0,4	0,2	0,1	-0,3	-0,1
13 branches	0,2	0,1	0,0	-0,2	-0,1
14 branches	0,1	0,02	0,01	-0,09	-0,01

Source: Author's calculations.

During the analyzed period, their number increased on 22.3 and 8.8 percentage points respectively. Consequently, there is a process of quantitative reduction of multi-sectoral agricultural enterprises, which indicates the process of deepening the specialization of economic activity.

Based on the results of the study, it would be reasonable to conclude that the disproportions of the development of agricultural enterprises arose as negative consequences of destructive phenomena in the agrarian economy of Ukraine and led to the destruction of the material base of livestock breeding. The failure of agricultural enterprises to produce livestock products was affected by the violation of price proportions among the main branches of agriculture. Therefore, for a long time, the grain price, pork and poultry prices were not favorable. Only in recent years, there has been a positive trend in such areas as pig and meat poultry farming.

Confirmation of the author's conclusion is the value of the Herfindel-Hirschman coefficient, the coefficient of diversification, the index and the relative index of entropy (Table 3).

Table 3 **Calculation of indicators of concentration and diversification of production in agricultural enterprises of Ukraine**

Indexes	Year			2016 to	
	2005	2010	2016	2005	2010
Herfindel-Hirschman coefficient	0,823	0,790	0,795	-0,028	0,005
Index of entropy	1,949	1,851	1,889	-0,06	0,038
Diversification factor	0,855	0,816	0,809	-0,046	-0,007
Relative index of entropy	0,093	0,088	0,086	-0,007	-0,002

Source: Author's calculations.

Calculations of indicators in table 3 testify to the presence during the investigated period of the monopolization process of production in agricultural enterprises. It confirms the values of the entropy coefficients, which have a direction vector to zero. The coefficients of agricultural production diversification decreased slightly during the period under study. Consequently, the tendency towards concentration of production is observed in certain agricultural enterprises (egg and poultry breeding) and in the commodity group of crops (for example, growing of cereals and industrial crops).

According to the research "The largest holdings in crop production in Ukraine" AgriSurvey Agency of the Association "Ukrainian Agribusiness Club", the first place for grain production take UkrLandFarming of Oleg Bakhmatyuk. As the largest latifundist not only in Ukraine but also in Eastern Europe, the company produces almost a tenth of all grain grown by agroholdings and generates about 3% of the total Ukrainian crop. Three of the leaders are the largest producer of chicken "Myronivsky Hliboproduct" and New Century Holding of George Rora [1].

According to FAO estimates, aggregate grain crops production in Ukraine is estimated at 8 to 9 million tons. By 2015, it can be 60-80% and reach 13-16 million tons, according to the FAO Regional Office for Europe and Central Asia. Dynamics should be considered a natural phenomenon, since large companies have opportunities for investing in production, access to modern agrotechnologies and highly skilled management [2].

One of the main preconditions for diversification is the improvement of the financial condition of economic entities. Accordingly, the efficiency of the diversification process of agricultural enterprises is characterized by an increase in the level of profitability of economic activity, improvement of the financial state, etc.

Agriculture today is in a state of uncertainty. On the one hand, thanks to the natural and climatic conditions, the industry provides high yields, a flexible tax system is created, state subsidies programs and support to the agrarian sector are implemented. However, due to an imperfect algorithm for the implementation of planned programs, the lack of an active market mechanism for product sales, the manual management of pricing in the industry, the dominance of traders and intermediaries reduces the positive indicators to nothing [3].

During 2010-2016 there is a positive value of the level of profitability of operational activities of highly specialized agricultural enterprises, which specialize in the production of both crop and livestock products (Table 4).

Table 4 Dynamics of the financial result of operating activities of agricultural enterprises depending on the level of specialization

Year	the cultivation of annual and biennial crops		growing of perennial crops		animal husbandry		mixed agriculture	
	profitability, %	the share of profitable in the total number of enterprises,%	profitability, %	the share of profitable in the total number of enterprises,%	profitability, %	the share of profitable in the total number of enterprises,%	profitability, %	the share of profitable in the total number of enterprises,%
2010	27,8	72,9	21,3	67,0	19,9	63,0	–2,3	69,6
2011	26,3	86,2	19,0	68,6	22,1	69,0	10,4	81,9
2012	21,7	80,1	52,3	68,7	27,6	71,2	12,2	79,2
2013	8,8	81,8	70,8	70,0	23,1	70,8	1,9	75,6
2014	23,0	86,5	68,9	69,0	23,8	74,6	–32,4	80,7
2015	47,2	90,7	43,8	75,6	33,1	78,0	–13,6	80,9
2016	38,4	90,4	26,1	72,2	16,0	72,8	10,6	80,5
2016 in relative indicators to 2010	10,6	17,5	4,8	5,2	-3,9	9,8	12,9	10,9

Source: Author's calculations.

However, in the multi-sectoral farms of the corporate sector there is no stable pattern of profitability of production. It is evidences of the absence of a positive effect on the diversification of production and economic activity of business entities in the field of agribusiness.

There is an increase in the share of farms in the corporate sector of the agrarian economy that have gained profit by the results of the fiscal year, indicating positive trends in the development of the Ukrainian agrarian sector. The proof of this is the increase in the profitability of economic activity of agrarian units of the corporate sector of the agrarian economy of Ukraine.

According to the assessment of the agricultural enterprises economic activity, the concentration of productive resources for the production of monoproducts in the absence of a system for planning production and consumption of agricultural products and foodstuffs leads to a significant risk and affects the level of profitability. A similar situation occurs in multi-sectoral farms (Table 5).

The highest level of agricultural production profitability was made by commodity producers who specialize in the production of 2 types of agricultural products. A stable level of profitability was maintained throughout the period under study. In 2006-2016 there were significant fluctuations of the efficiency indicator in multi-sectoral agricultural enterprises, indicating a sub-optimal selection of economic activities.

Thus, agricultural enterprises that produce 14 types of products during the investigated period were unprofitable. In 2006 and 2010, in agricultural enterprises that produced 6-7 types of products, the amount of profits received from growing crop production compensated losses from the production of livestock products, which ultimately ensured a positive result from the conduct of economic activity.

Table 5 **Efficiency of agricultural enterprises functioning in Ukraine depending on the number of branches**

	2005			2010			2016		
	total profitability,%	incl.		total profitability,%	incl.		total profitability,%	incl.	
		plant growing	animal husbandry		plant growing	animal husbandry		plant growing	animal husbandry
1 branch	10,2	1,5	18,6	16,6	21,6	11,7	22,5	35,7	5,1
2 branches	16,6	-0,5	34,9	15,6	14,8	17,2	41,5	49,1	10,9
3 branches	9,1	9,1	8,9	12	12,8	7,5	38,4	40,7	19,4
4 branches	5,9	7	4,2	14,7	16,9	4	38,0	43,9	3,6

	2005			2010			2016		
	total profitability,%	incl.		total profitability,%	incl.		total profitability,%	incl.	
		plant growing	animal husbandry		plant growing	animal husbandry		plant growing	animal husbandry
5 branches	4,1	7,4	-2	7,8	14,4	-9	34,6	42,0	4,8
6 branches	3,9	7,3	-1,7	22,5	21,8	24,2	34,6	43,7	6,6
7 branches	4,9	9	-1,7	11,7	20,2	-6,8	33,4	44,9	3,6
8 branches	5	10,7	-4,4	14,1	21,4	-9,1	45,2	62,0	-2,1
9 branches	8,2	11,3	3,3	15,5	22,8	-0,1	42,6	51,2	4,0
10 branches	9	12,2	3,8	11,2	20,7	-4	29,3	32,5	11,6
11 branches	7,6	11,6	1,9	13,3	22,6	-12,1	34,0	41,6	-12,6
12 branches	22,9	26,5	18	22	39,5	-2,7	63,4	85,5	22,6
13 branches	13	16,2	8,7	-4,8	12,3	-14	60,2	112,6	11,7
14 branches	-14,2	-3,8	-20,3	-9,8	-2,5	-17,1	6,6	17,5	-13,9

Source: Author's calculations.

The focus on the production of mono products in the corporate sector of the agrarian economy can lead to a significant decline in soil fertility. Most agricultural producers, by concentrating their productive resources on the cultivation of a small list of crops, ignore scientific recommendations on the effective use of agricultural land. Thus, in the structure of sown areas during 2005-2016, the share of grain and leguminous crops was 52.7-53.2, technical crops (mainly sunflower) – up to 27%.

In assessing the structure of the crop area of agricultural enterprises, that according to scientific recommendations, the share of grain in the total area of crops should be up to 50%. The actual value exceeds the standard by 2.7-3.2%. It should be noted that the proportion of sunflower, the share of which in crops, on the development of scientists and practitioners, should be no more than 15% [4, 5, 6, 7], is also not scientifically justified. In the investigated period, in fact, this indicator was 80% higher than the above-recommended level. This leads to rapid depletion of soils, deterioration of the environment. In addition, due to the high proportion of grain and sunflower, scientific-based crop rotation is not allowed (since there are not enough precursors for demanding crops).

The narrow specialization of agricultural producers, and sometimes practically monoculture, increases the risks of both agrobiological and economic nature. Violation of crop rotation leads to soil depletion, pest reproduction, unstable crop

Years	Total cost, c/ha	processing enterprises		shareowners at the expense of rent		on the market		other business entities	
		price, c/ha	profita-bility, %	price, c/ha	profita-bility, %	price, c/ha	profita-bility, %	price, c/ha	profita-bility, %
2010	229	294,9	28,8	249,4	8,9	308,8	34,8	272,4	19,0
2016	395	433,68	9,9	359,32	-9,0	463,76	17,5	453,07	14,8
Pigs									
2005	819	1062	29,7	1144	39,7	927	13,2	927	13,2
2010	1324	1284	-3,0	1458	10,1	1128	-14,8	1249	-5,7
2016	2190	2430,17	11,0	2198,28	0,4	2365,32	8,0	2448,71	11,8
Eggs (thousand pcs)									
2005	207	248,5	20,0	240,2	16,0	238,1	15,0	257,9	24,6
2010	398	528,8	32,9	532,5	33,8	418	5,0	484,1	21,6
2016	863	1378,6	59,8	898,1	4,1	1043,2	20,9	1347,2	56,2

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

Assessing the sales efficiency of the main types of livestock products, it should be noted that the highest level of profitability in milk sales is observed through a network of retail food markets and branded stores. The highest level of efficiency in the sale of pigs in 2016 occurs when sold through food markets and business entities. Although in 2005 the sales channel was the most profitable for processing enterprises.

A similar change in the profitability vector is observed when eggs are sold by agricultural enterprises. In accordance with the fluctuations in the efficiency of implementation, depending on the distribution channels, the structure of the implementation of the main types of livestock products should also change. Thus, during 2005-2016 there is a further increase in the share of milk sales to enterprises of the corporate sector of the agrarian economy by processing enterprises, despite a decrease in the level of profitability.

It should be noted, that the economic benefit of selling agricultural products to intermediary structures is to minimize transportation costs, short settlement times, and so on. A similar situation occurs in the implementation of eggs.

In general, the problem of diversification of livestock production distribution channels is characterized by a certain degree of conservatism, the biological

characteristics of the product, such as the impossibility of storing for a long time and the lack of seasonality in production.

One of the components of the activity of agricultural enterprises is the provision of services. According to statistics, agricultural enterprises that specialize in providing services in agriculture during 2010-2016, activity is loss-making, with the exception of 2012 (Table 7).

Table 7 **Dynamics of indicators of financial and economic activity of enterprises of the branch of agriculture, in which the main type of economic activity is "Supporting activity in agriculture and post-crop activity"**

Year	Number of enterprises		Profitability, %	Enterprises that have earned a profit in % of the total number of enterprises
	unit	in % to the total		
2010	1057	2,1	-2,6	44,3
2011	1067	2,6	6,5	42,3
2012	1055	2,2	4,5	40,8
2013	966	1,9	-2,6	36,8
2014	894	1,9	-25,1	36,2
2015	890	1,9	4,2	29,4
2016	763	1,7	8,1	32,4
2016 in % to 2010	72,2	-0,4 in relative indicators	10,7 in relative indicators	-11,9

Source: Compiled and calculated according to the data of the State Statistics Service of Ukraine.

The presented calculations in Table 7 indicate that the decline in the share of farms that ended the fiscal year with a positive financial result. In 2016, against 2010, the share of profitable agricultural enterprises with KVED "Support activities in agriculture and post-harvest activity" decreased by 11.9.

It should be noted that the share of profitable in the structure of farms providing services is small. Nevertheless, the level of profitability of services is also low. According to the results of the research during 2010-2016, there is a gradual decrease in the profitability of the aforementioned type of activity of agricultural enterprises.

Now the agricultural services segment is not engaged the number of operators and the product portfolio and has the potential to expand and accordingly diversify the production activities of commodity producers in the industry. The results

of grouping of agricultural enterprises by the level of profitability of services rendering, evidence of a significant variation in the values of this indicator (Table 8).

Table 8 **Group of agricultural enterprises by the level of profitability of services rendered, 2016**

Groups on the profitability of services, %	Number of farms in the group	Share of households in the whole, %	Revenues from services rendered to 1 enterprise, ths. UAH	Profit from services rendered, UAH million	Income from services rendered to one enterprise, ths	Cost-effectiveness of services, %	Share of revenue from services rendered in total revenue, %
To 0	964	28,0	1629	-379	-393	-19,4	3,4
0,14-20	768	22,3	2016	113	148	7,9	3,7
20,1-40	405	11,8	2402	213	525	28,0	3,5
40,1-60	238	6,9	2274	178	749	49,1	4,3
60,1-80	174	5,1	3585	255	1463	69,0	4,0
80,1-100	145	4,2	1617	111	764	89,6	2,6
More than 100	749	21,8	2009	983	1312	188,4	4,2
Total	3443	100,0	2032	1474	428	26,7	3,7

Source: Calculated by the author.

According to the results of the research conducted, 72% of the enterprises of the corporate sector receive a profit from the provision of services. In the structure of total revenue, the share varies between 3.4-4.3%, which indicates a low level of unrelated diversification of production and economic activity. This circumstance is due in the first place to the peculiarities of taxation of agricultural enterprises.

4   Conclusions

Assessing the level of agricultural enterprises efficiency, there is a clear picture: the dispersion of production and financial resources leads to a decrease in the efficiency of their functioning. The most optimal in terms of efficiency are farms that produce 2-3 types of agricultural products, which are part of the livestock and plant industries, which minimizes production risks.

Consequently, in the case of agribusinesses diversifying into related industries, that is, when existing technologies and equipment can be used for the production

of new products, this allows us to determine the widest possible range of diversification in related industries. So, if the income after diversification is greater than the amount of existing income and income growth, further diversification is appropriate, since it allows you to reduce specific fixed and conditional fixed costs (cost savings are positive). As soon as the specified condition is not met, the company should use a different approach to determining the appropriateness of diversification, as diversification either does not already have the character of a related one, or further increase in output will require significant new investments.

An important factor that can increase the efficiency of the enterprise because of choosing a diversification strategy is the application of new technologies. Innovations in this case act as a factor that can improve the efficiency of the enterprise, as well as a prerequisite for the implementation of diversification.

When implementing the strategy of economic diversification ensuring an acceptable ratio between profitability and risk level. This ratio is determined by each enterprise for itself, and it depends, on how owners and managers of agrarian enterprises are at risk. The general risk consists of two components: unsystematic (diversified) risk - it is inherent in a particular enterprise and is subject to a reduction because of diversification and systematic (not diversified, market) risk - it is generated by external factors of the environment of agricultural enterprises.

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SESSION 9

AGRICULTURAL UNIVERSITY EDUCATION, QUALITY ASSURANCE, HUMANITY STUDIES AND MATHEMATICS EDUCATION

SEVERAL GEOGEBRA SOLUTIONS FOR MICROECONOMICS

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Abstract

Visualization through the use of physical objects is an important method that teachers can use to convey and solidify an understanding of mathematical or economic principles in their students. Creating visual representations for students can open up understanding. The paper deals with the solution of selected microeconomics problems using software GeoGebra. We focused on content of education of the students of Faculty of Economics and Management Slovak University of Agricultural in Nitra. Presented examples can be used for mathematical or microeconomic lessons. Created study material and applets, presented in article, will be available to students in LMS Moodle course "Matematická analýza" (http://moodle.uniag.sk/). We use LMS Moodle to augment face-to-face education. Our research shows that 88% of students believe that online courses are excellent support for the learning process and self-study.

Keywords: *visualization, GeoGebra, mathematics, microeconomics*

JEL classification: *A12, A22, I20*

1   Introduction

Math is a subject, in which it is aimed to develop analytical thinking skills that could develop students' abstract thinking and allows them understand cause and effect relationship between the events (Yenilmez and Özbey, 2006). In solving word problems in mathematical economics, two different knowledge bases are required: a database of math formulas and a database of economics theories (Shirota, Hashimoto and Stanworth, 2013). Solving a word problem in mathematical economics is nothing more or less than conducting a process of deductive

reasoning to find the unknown of the problem (Betsur, 2006). To construct the deductive reasoning process is to collect missing pieces of information from the knowledge bases, to bridge between the given data and the unknown of the problem (Shirota, Hashimoto and Stanworth, 2013).

Visualization of economic concepts through the use of physical objects is an important, and underutilized, method that teachers can use to convey abstract economic concepts with a permanence that lends power to their economic arguments, a method which will help students to understand and remember the concepts more fully (Johnson, 2007). Visualization is no longer related to the illustrative purposes only, but is also being recognized as a key component of reasoning (deeply engaging with the conceptual and not the merely perceptual), problem solving, and even proving (Arcavi, 2003). Why economists build mathematical models? Mathematical representation of all forms is used widely, becoming increasingly important in science as the sophistication level of the models employed rises (Gilbert, 2010). A visual example helps to convey and solidify the fundamental understanding that economists use models to identify and describe key relationships in a world that consists of a complex interrelated web of relationships (Johnson, 2007). Some people may claim to "see" through symbolic forms, regardless of their complexity, but for others, visualization can have a powerful complementary role in the three aspects (Arcavi, 2003), visualization as:

a) a support and illustration of essentially symbolic results,
b) a possible way of resolving conflict between (correct) symbolic solutions and (incorrect) intuitions,
c) a way to help us re-engage with and recover conceptual underpinnings which may be easily bypassed by formal solution.

2   Why mathematical software in economical tasks?

Mathematics is an essential element of economics problem solving. The importance of math skills for study success in economics has been widely researched (Arnold and Rowaan, 2014; Arnold and Straten, 2012; Cappellari, Lucifora and Pozzoli, 2012). Students with strong elementary math skills have been performing significantly better in applied contexts which ones improve a student's ability to apply mathematics substantially (Gallo and Johnson, 2008). The application of mathematics and the performing of mathematical modeling and problem solving is suitable means for developing general competencies and attitudes of students. The mathematical software provides visual representation of special problems

can also be understood as a cognitive tool important to achieve a higher quality of visual thinking of students and their ability to apply complex mathematical knowledge. In our paper we present economic problems that can be solved from the perspective of the economic or mathematical system and also using software GeoGebra. Understanding given problems from a mathematical point of view it will help to understand the problems in general. We agree with Vallo, Páleniková and Rumanová (2017) that using ICT in education process and dynamic nature of software could help teachers develop necessary students' thinking skills and motivate students to find out new relation between given data.

Models in economics have the wide range of forms including graphs, which are considered an essential tool of economic analysis. Graphs allow understand the links between economic variables and are useful way for their better understanding (Országhová, 2015). Visualization through graphs is an important element of the learning and teaching process, and often provides a critical link between abstract concepts and developing understandings. This is one of the most effective methods to understanding economics models because one picture can spawn a thousand ideas. Visual stimuli can help not only in the learning of economics, but in the retention and application of that knowledge well after our students graduate (Johnson, 2007).

3   Some application examples

Solving applied tasks helps create links between study subjects, and furthermore, compile logical associations between theoretical knowledge and practical usage (Hornyák Gregáňová and Országhová, 2017). Application problems develop students' independence, activity and creativity (Pavlovičová and Rumanová, 2012). When students solve application problems, then they learn not only to formulate problems but also solve them in specified contexts and at last formulate the correct conclusions of given problems.

In this section we deal with few possible applications. Defined mathematical-economic issues are solved by software GeoGebra. We focused on content of education of the students of Faculty of Economics and Management Slovak University of Agricultural in Nitra. Presented examples can be used for mathematical or microeconomic lessons. In all problems, we inspired by Agarwala (2008), Barnet, Ziegle and Bylee (2008), Deepashree (2016), Macdonald, Breidenbach and Doetschman (2003), Turnovec (1993).

3.1 Budget line and budget constraint

A budget line is a line which shows all possible combinations of two goods that a consumer can buy with his income and price of the commodities. Budget constraint means that total expenditure incurred on the two goods should not be more than the income of the consumer. Graphically, the budget constraint is represented by the budget line and budget set. Budget set is the collection or set of all the possible bundles or combinations of two goods that the consumer can buy with his income and prevailing prices of the commodities. We analyse the changes in budget line in the following problems. The graphical interpretation of these problems is part of the solution. Using GeoGebra in solving those problems could help teachers develop necessary students' thinking skills and open up understanding of students.

Problem 1: The equation for the budget line is

$$p_1 x_1 + p_2 x_2 = M$$

where: p_1, p_2 are prices per unit of goods,
x_1, x_2 are the quantities of goods,
M is total income of consumer.

Suppose government imposes income tax u, a quantity tax t per unit on good x_1 and a subsidy of d per unit on x_2. Write the budget equation after the introduction of taxes and subsidy and analyse the conditions under which the introduction of taxes and subsidy for households will be disadvantageous in any structure of consumption.

Solution: The budget equation after the introduction of taxes and subsidy is:

$$(p_1 + t)x_1 + (p_2 - d)x_2 = M - u$$

When income decreases due to the income tax, it shifts the budget line leftward. The shifts are parallel. Per unit tax on production of a good makes it dearer and has the same effect as the rise in price of the good, the absolute slope of budget line will be increased:

$$\frac{p_1}{p_2} < \frac{p_1 + t}{p_2}$$

Per unit subsidy on production of a good makes the good cheaper and has the same effect as fall in price of the good, the absolute slope of budget line will be decreased:

$$\frac{p_1}{p_2} > \frac{p_1}{p_2 - d}$$

Figure 1 **Graphical solution of problem 1 through GeoGebra**
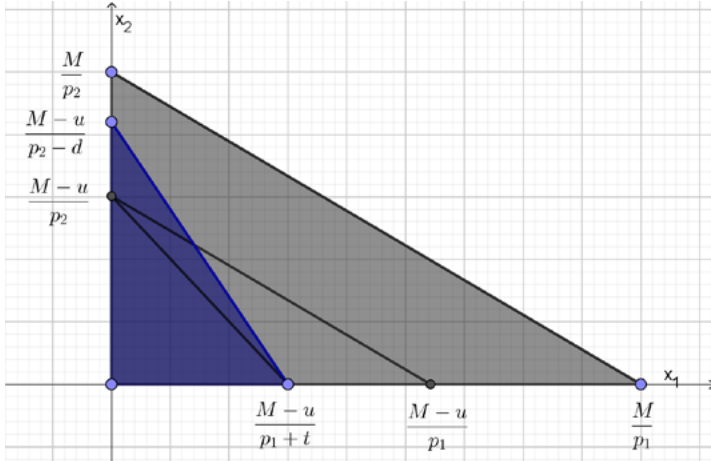
If all these changes occur at the same time and must to have only a negative impact on the household, we get:

$$\frac{M-u}{p_2-d} < \frac{M}{p_2} \Rightarrow p_2 * u > M * d$$

(see Figure 1). The consumer spends his entire income on x_2 with number of units equal to

$$\frac{M-u}{p_2-d}$$

and on x_1 with number of units equal to

$$\frac{M-u}{p_1+t}$$

The budget set will be decreased. From the mathematical expression of the budget set we get:

$$(p_1+t)x_1 - (M-u) > -(p_2-d)x_2$$

$$p_1x_1 + tx_1 - M + u > -p_2x_2 + dx_2$$

$$p_1x_1 + p_2x_2 + tx_1 - (p_1x_1 + p_2x_2) + u > dx_2$$

$$tx_1 + u > dx_2$$

Problem 2: Suppose a consumer has income 600 € and the price of the food he consumes is 4 € per kilogram. Graphically interpret the monthly budget constraint of the consumer. What is the new budget line in case that:

■ government allows the consumer to get 20 kg of free food,

- government provides the consumer 150 € per month,
- government allows the consumer food stamp (unlimited), they can to buy food worth 6 € for 3 €.

Solution: The budget constraint of this situation can be written as $4x_1 + x_2 \le 600$ (triangle OAB on Figure 2). If government allows the consumer to get 20 kg of free food, the budget line can be written as

$$x_2 = \begin{array}{l} 600, x_1 \in \langle 0,20 \rangle \\ 600 - 4(x_1 - 20), x_1 \in \langle 20,170 \rangle \end{array}$$

(the line 1 on Figure 2).

If government provides the consumer 150 € per month, increase income of consumer $M=600+150=750$ and new budget line has the equation $4x_1+x_2=750$ (the line 2 on Figure 2).

Figure 2 **Graphical solution of problem 2 through GeoGebra**
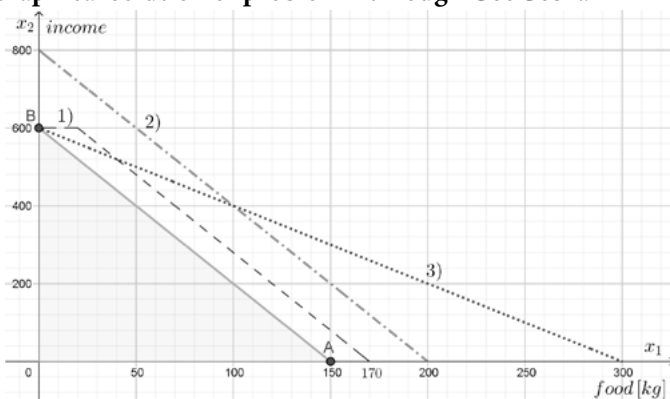
If government allows the consumer food stamp (unlimited), consumer income is not changed, but the amount of food that can be consumed for that income. If consumer spends his whole income on food stamp only then can buy

$$\frac{600}{3} = 200$$

stamps and

$$\frac{200*6}{4} = 300kg$$

of food. So the new budget line has the equation

$$2x_1 + x_2 = 600$$

(the line 3 on Figure 2).

3.2 The slope of concave curve and opportunity costs

In the real world, we tend to observe increasing opportunity costs which result from specialized resources that are better suited at one productive endeavour than another. The concavity of the production possibilities curve implies increasing opportunity costs of production. For example, we can visualised PPC as a segment of a circle, because in our case is the production potential of both goods the same. The measurement of the opportunity costs is obtained by calculating the slope of the curve at any given point. The slope of concave curve varies from one point to the next. It can be illustrate by drawing a line tangent to the curve at a specific points (see Figure 3). It is clear that the slope of this concave curve is negative and the absolute value of the slope is increasing as the quantity of goods produced increased. This is a reflection of the real world notion of increasing opportunity costs. The opportunity cost refers to the highest valued alternative that is forgone as a result of making a choice.

Problem 3: Company of Woodland can only produce two goods – cheese and wine. Production possibilities curve (PPC) is the segment of the circle mathematical formulated by function

$$f : y = \sqrt{625 - x^2}$$

with domain

$$D(f) = \langle 0, 25 \rangle$$

Calculate and graphical illustrate the slope of PPC at points $x = 8, 15, 22$. From which of these values of x is the absolute value of the slope greatest? What does this indicate?

Figure 3 **Graphical solution of problem 3 through GeoGebra**
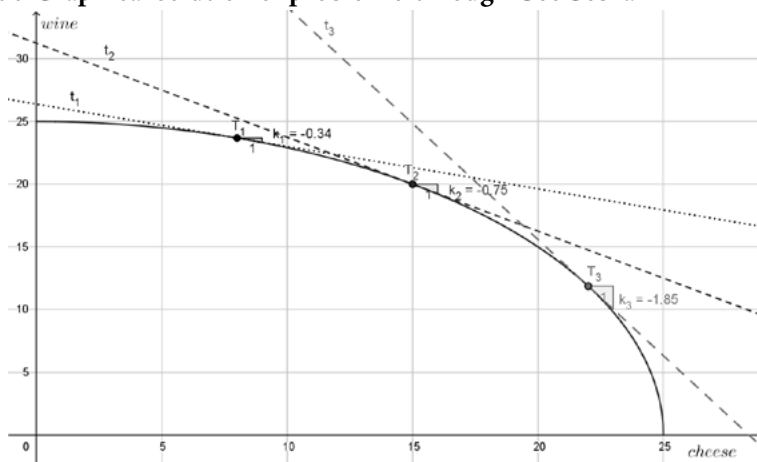
Solution: The slope of the function

$$\frac{\Delta y}{\Delta x}$$

can be approximated by taking the first derivative

$$\frac{dy}{dx}$$

The first derivative

$$y' = \frac{dy}{dx} = \frac{1}{2}(625 - x^2)^{\frac{-1}{2}} * (-2x) = \frac{-x}{\sqrt{625 - x^2}}$$

is negative for 0≤x≤25, so we can say that the slope of the graph is negative. Negative slope tells us that, as *x* increases, *y* decrease. The first derivative of the function *f(x)* is the slope of the tangent line to the function at the point *x*.

When *x*=8, the slope is

$$\frac{dy}{dx} = \frac{-8}{\sqrt{624}} = -0.34$$

When *x*=15, the slope is

$$\frac{dy}{dx} = \frac{-15}{\sqrt{400}} = -0.75$$

When *x*=22, the slope is

$$\frac{dy}{dx} = \frac{-22}{\sqrt{141}} = -1.85$$

The absolute value is greatest when x=22. This means that the rate of change of the function is increasing. Each increment of x causes larger and larger increments of y.

4   Students' views

Only creation of application tasks is not enough. These materials need to be use in the educational process. Teachers of Slovak University of Agriculture in Nitra used blended learning to combines traditional learning and e-learning. We use LMS Moodle (Modular Object Oriented Dynamic Learning Environment) to augment face-to-face education. So, created study material and applets, presented in article, will be available to students and teachers in LMS Moodle course "Matematická analýza" (http://moodle.uniag.sk/).

Students' attitudes to selected method of teaching (blended learning) and using mathematical software or application tasks were determined by questionnaire. We have compiled a questionnaire that students filled out on mathematical exam.

We present results of research, with the participation 603 full-time students (422 women and 181 men): 252 students of Faculty of Biotechnology and Food Sciences (178 women and 74 men), 274 students of Faculty of Economics and Management (189 women and 85 men) and 77 students of Faculty of European Studies and Regional Development (55 women and 22 men). We found that 92% of students have network access at home. We can conclude from the research results that we have chosen the correct method of teaching mathematics, because 57% of students reported that they prefer combined form of teaching mathematics (full-time education supplemented internet course) and 88% of students believe that online courses are excellent support for the learning process and self-study mathematics. 42% of women and 49% of men prefer face to face teaching. But these students also recognize the importance of e-learning, because only 5% of students reported that these courses do not meet the purpose and lack of teacher explanation. We found that students attending courses mainly at the preparation of continuous semester tests and exam (56%). In spite of frequent questions "why we have to study math", only 11% of the students studied the applied problems and only 2% of them all used internet links and read articles dealing with interdisciplinary relationships. There was little interest in material about mathematical software. Only 35% of the students met, and only 12% of them were interested in such materials that they used the mathematical software to solve the seminar work on the course of the function.

5   Conclusion

Visual images are a powerful way of transferring mathematical thinking and information because it transmits information in ways that words cannot. The visualized solution is smooth and effective, and, in addition, the process of visualizing provides opportunities for discovery moments. We can say that software GeoGebra is suitable for demonstrations and explorations of the behaviour of the microeconomic characteristics. Through graphical interpretation of the tasks we link aspect of the illustration of the object with aspect of the representation and the description of microeconomic phenomenon and allow development of visual literacy of students. We use LMS Moodle to augment face-to-face education, because our research shows that 88% of students believe that online courses are excellent support for the learning process and self-study. Created study material and applets, presented in article, will be available to students in LMS Moodle course.

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SCIENCE AND RESEARCH AS IMPORTANT PART OF AGRICULTURAL SCIENCES

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Abstract

The aim of the paper is to evaluate the position of science and research in the agricultural sciences based on selected indicators but not only in the retrospective but also to outline possible trends in this area. Through by the mathematical and statistical methods, we will evaluate the volume and structure of funds which to support for science and research in agricultural sciences for the period 2003 - 2016. Agriculture has a specific position in the economy of each country, closely related to the functions it provides for society. The most important is function production, through which it ensures the production of food for society. But also non-productive functions of agriculture are also important. It is above all an environmental function, which includes the protection of individual components of the environment as well as landscaping. The purpose of this function is to care of the country. The Strategy Paper "The Strategy for the Development of Slovak Society by 2020" states, that the aim of strategy in the research and development will be to support the creation of new knowledge, the cooperation of the research sector with economic practice and with the European institutions, which will ultimately contribute to more efficient of the technological development and for the innovative progress based on domestic research. Despite the fact, that science and research in the agriculture sciences is predominantly focused on obtaining results that can be directly applied in practice, this area is not adequately financing. This is closely related with the low motivation of young researchers to work in this area. Therefore, one of the partial aims of the paper is also an evaluation of the development of the number of employees in the agricultural science and research. The each country should be supporting and developing of efficient

agriculture sector. The result of this policy should be food security for society and sustainable land development. The science and research they can make a significant contribution to tackling the unfavourable situation in the agriculture and protecting of the sustainable development. One of the steps taken by the Ministry of Agriculture and Rural Development of the Slovak Republic to support not only the science and research in the agriculture is the establishment of the Agricultural Policy Institute, which has the ambition to be an analytical department of the Ministry. Its mission is to improve the decision-making of the ministry through data analysis and the subsequent creation of forecasts in the agriculture, food, forestry and rural development.

Key words: *Agricultural sciences, science and research, financing, researchers*

JEL classification: *C22, Q01, O34*

1 Introduction

Higher Education Institutions play an important role in the promotion of sustainability and an increasing number of stakeholders expect them to be sustainable organizations. However, this can only be achieved when barriers are faced and challenges overcome (Aleixo et. al. 2018). It also confirm Galová et. al. (2016) who say that well-performing education as a result of investment into knowledge shall be the core of any educational institution providing new skills and competences, which in the end will benefit not only the institution and the individual, but the society as well, ensuring competitiveness on the labor market and social inclusion. Internationalization in case of universities means creating links and strengthening cooperation with partners all around the world in order to ensure study or research opportunities with different aims and for various target groups, students as well as teaching and other staff included.

Since 2002, the system of funding of universities has undergone far-reaching changes. The most of universities transformed (with the exception of colleges in the interior sector and defense sector) from state budget organizations to public higher education institutions, which have gained substantially more autonomy in the economic sphere. The increase of autonomy has influenced view of the way in which higher education is financed by the state. On the one hand, the state provided to universities autonomy in order to motivate them to become more active. On the other hand, the method of financing has remained one of the few instruments by which the state can influence the activities of higher education institutions and support the state policy of higher education. The breakdown of state budget funds for higher education institutions was based almost exclusively on the index principle until 2000. Depending on the performance derived from

the number of students and the coefficients determined on the basis of the faculty type and adjusted by voting in the bodies of the representation of higher education institutions, only a few percent of the total amount was provided from the state budget to higher education institutions. For the breakdown of research, development, or artistic activities, from the beginning of the new system, efforts have been made to use the performance principle based on research performance (Mederly, 2009).

Human resources are the basic prerequisites for the development of science and research. Human resources in research and development are a decisive factor in increasing scientific knowledge, technological progress, increasing the competitiveness of the Slovak and European economy and improving the quality of life of the population and ultimately, the successful development of the knowledge society. From 1989 in Slovak Republic, there was a large decrease in R&D personnel and researchers. This decline was due to two main factors: internal and external migration of researchers. Internal migration has led to the transfer of academic and university researchers to the commercial sphere (banking sector, information and communication companies, etc.). External migration, t. j. the participation of researchers in foreign research teams and institutions has made that the results of research projects are reported outside the Slovak Republic (Kačírková, 2012). The R&D infrastructure is made up of R&D personnel, represented by researchers, technicians, and equivalent and support staff. It also includes devices, tools, information, communication and technological units and systems, as well as other movable things and buildings that serve for research and development needs. (Law No.172/2005 Coll. about organization of state support of research and science). Support for research and development under Act No. 172/2005 Coll. is carried out through grants from the state budget in the form of non-repayable aid. Funds are provided through the budget chapter of the Ministry of Education, Science, Research and Sports of the Slovak Republic unless this Act stipulates otherwise. Forms of R&D support present grant form of R&D support provided under a competition under paragraph 18 section 1 of Law 175/2005 Coll. and the institutional form of R&D support. Investing to the R&D and innovation is the one way of increasing of competitiveness. In the current period, a large part of the science budget is spent on research on information and communication technologies. Bobáková (2009) say that better way could be focus on high value added research. Although the European Commission points to such a Finland's good experience of the 1990s and encourages individual Member States to fund such science and research, only a few countries have decided to go this way. The Europe Strategy 2020 mention, that states should invest up to 3% of GDP into science, research and education. In Slovakia, funding from extra-budgetary

resources, particularly from the private sphere, is significantly behind. One reason is that the biggest companies operating in the country are foreign companies that support basic research in their mother countries, and Slovak companies are not strong enough to invest big amounts of funding in their research (Švecová and Rajčáková, 2012).

2 Data and methodology

Agricultural sciences are the fourth of the six basic groups of science and technology groups as defined by the Organization for Economic Cooperation and Development. This division was also taken into account in the current valid Slovak legislation regulating the state support of research and development. Agricultural sciences form a special epistemological category of systematic knowledge of things and phenomena through standardized observation, measurement, analysis and interpretation techniques. The field of agriculture is one of the disciplines in the field of science, which is one of the biggest challenges in the context of the membership of the Slovak Republic in the European Union - to change European agriculture for an efficient and competitive sector. This is a science area which present the key importance for both human health and quality of life. In terms of more detailed breakdown in the Slovak Republic, the following subgroups are included in the sphere of agriculture[1]:

- Agricultural sciences, forestry and fisheries
- Animal production
- Veterinary sciences
- Biotechnology in agriculture
- Other departments of agricultural sciences

All data analyzed in this paper were drawn from publicly available databases of the Statistical Office of the Slovak Republic. The data were analyzed by standard data comparing methods. The calculations were carried out in MS Excel, which was also used to create graphical presentation of the results.

3 Results and discussion

Expenditure on R&D may, in terms of macroeconomic figures, be considered as an investment of the economy into productivity in the future. Naturally appropriate periods for such investments are periods of favorable economic development

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[1]   https://www.vedatechnika.sk/SK/VedaATechnikaVSR/odboryVaT/Stranky/Podohospodarske-vedy.aspx

(team of authors, 2008). From the analysis of expenditure on R&D as % of total general government expenditure in 2005, 2010, 2015, and 2016 we can see that Slovak Republic did not reach the EU-28 average in any analyzed year (picture 1). The share of government expenditure on R&D is below 1%. Compared to 2005 and 2016, share of government expenditure grew slightly from 0.69% to 0.9%. Of the V4 countries, only the Czech Republic issues for R&D more than 1% (1.21% in 2005 and even 1.49% in 2016). In 2016 it was even more than the EU-28 (Czech Republic – 1.49%, EU 28 – 1.37%). From the analyzed countries at most share of government expenditure on R&D gave every year Germany. A decrease of government expenditure on R&D we can show in France (2005 – 1.78%, 2016 – 1.12%), in Poland (2005 – 0.66%, 2016 – 0.39%) and United Kingdom (2005 – 1.49%, 2016 - 1.25%).

Picture 1 **Share of government expenditure on R&D in the period 2002-2016 (% of total general government expenditure)**
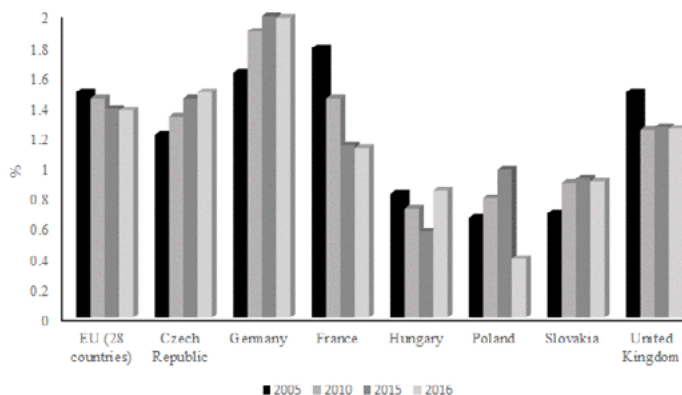
Source: Statistical Office of the Slovak Republic, own processing.

The volume of expenditure for R&D in the Slovak Republic in the period 2002 to 2016, with the exception of 2009 and 2016, is growing. Different developments can be observed within the share of expenditure on science and research on GDP (picture 2). The lowest volume of expenditures was recorded at the beginning of the analyzed period when they reached the value of 210.2 mil. Eur. On the other hand, the highest expenditures for R&D were provided in 2015 in the total amount of 927.3 mil. EUR, which represents a 4,412-fold increase in their volume. Regarding the share of expenditures for R&D on GDP, we can divide analyzed period into two parts. First part present period 2002-2007 when share fell from 0.56% to a minimum in 2007 when it reached 0.45%. Second part present

the following years, when the expenditures for R&D on GDP increased year-on-year by an average of 1.13 times. In 2016, the volume of expenditures on R&D in Slovakia reached only 69% of the volume of expenditures for 2015 and their share in GDP also dropped to only 0.79%.

Picture 2 **The development of expenditure for R&D and their share on GDP in Slovak Republic in the period 2002-2016**
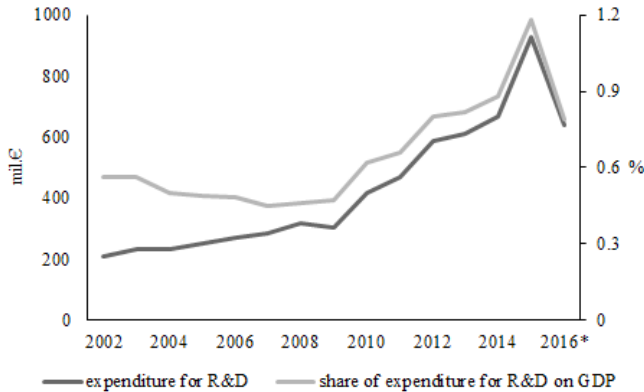
Source: Statistical Office of the Slovak Republic, own processing

From the point of view of the structure of expenditure, over the analyzed period, the current expenditure created approximately 86%. These expenditure to use for to ensure the functioning of scientific research institutions (picture 3). However, we can positively measure the similarly high share of capital expenditure for machinery and equipment, ranging from 58.23% (2003) to 94.26% (2011), which means, on average, that 80% of capital expenditure is invested in expanding and improving scientific and research conditions at workplaces. These resources are predominantly deployed in the Bratislava region, where on average 47% of the total volume of capital expenditure.

Picture 3 **The development of capital expenditure for R&D, expenditure for machinery and equipment and total expenditure in Slovak Republic in the period 2000-2016**
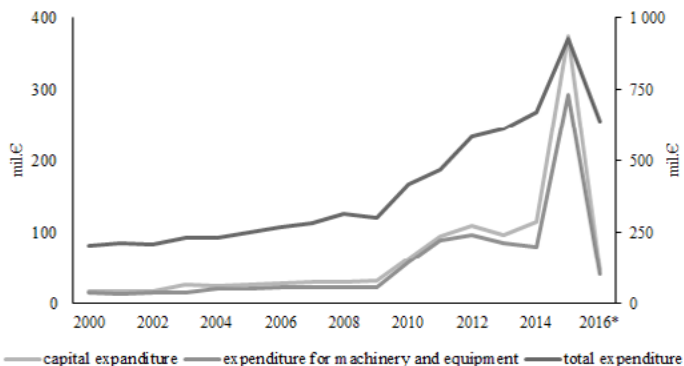
Source: Statistical Office of the Slovak Republic, own processing.

Current expenditure is used to secure the normal running for R&D. In the years 2000 - 2009 it is possible to follow the fluctuating trend in the development of total current expenditure. From 2010 we can see a yearly increase of total current expenditure. In 2016 compared to 2000, this is more than a 3 - fold increase of total current expenditure for R&D (picture 4). The current expenditure from public sources is mainly present the resources from the state budget. Except for years 2009 and 2013 they had increasing yearly trend. In 2016, compared to 2000, the growth of current expenditure from public sources was almost 3.5 times. A similar trend can also be seen in the current expenditure for R&D from private sources.

Picture 4 **The development of total current expenditure and current expenditure by type of resources for R&D in Slovak Republic in the period 2002-2016**
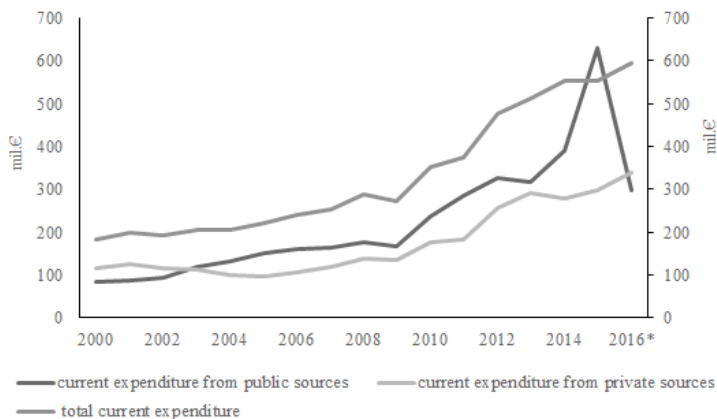
Source: Statistical Office of the Slovak Republic, own processing.

The results of R&D in individual scientific fields are the result of the scientific workers and ultimately should lead to for innovation. This is confirmed by several authors Fiľa and Kučera, (2015), Petrášová and Beresecká (2012), Papcunová, Urbaníková, and Dvořák (2017) who argue that creative activity is the result of intellectual creative activity, and in a simplified way it can be said that creativity is as important as capital and human work. Innovation is the driving force of each economy, economic competitiveness, and an essential component of the knowledge economy, which is based on the production of higher added value. From the analysis of expenditures on individual research field, we can see, that the highest share of expenditure is in the field of technical science, where the share created from 37.65% (2004) to 55.77% (2016) from the total volume of expenditure. In the field of agriculture, the volume of R&D expenditure at the beginning of the analyzed period to decline, when it dropped from 12.24% (2004) to 6.72% (2009), but the last ten years this share was 7.13%. A lower overall share of expenditure is achieved in humanities (picture 5).

Picture 5 **The development of expenditure for R&D by the research field in Slovak Republic in the period 2002-2016**
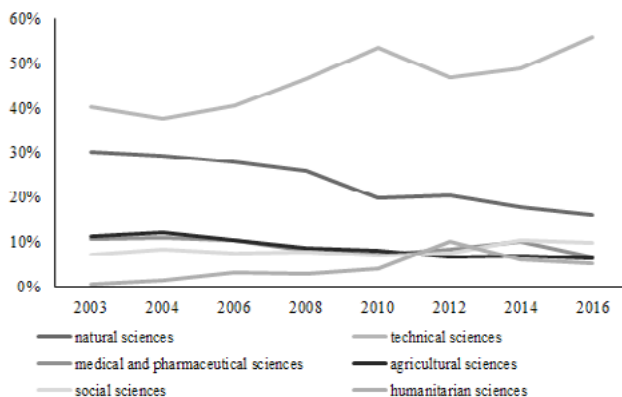
Source: Statistical Office of the Slovak Republic, own processing.

From the point of view of the structure of science and research expenditures expended in the field of agriculture, there is a positive trend. Since 2010, the share of capital expenditures has grown, and in the 2010-2015 period it was approximately 21.87% of the total expenditure (picture 6).

Picture 6 **The development of expenditure for R&D by the field of agriculture in Slovak Republic in the period 2002-2016**
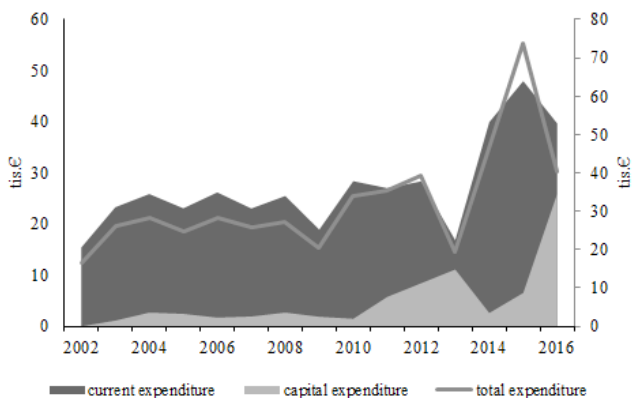
Source: Statistical Office of the Slovak Republic, own processing.

4   Conclusion

The results of the analysis show to the low volume of the invested financial resources not only in the scientific research activity as such, but also in the individual scientific fields in Slovak Republic, which persists for a long time. The analysis also revealed the fact that Slovak Republic spends less than 1% of total expenditure on R&D. Such under-funding of science is also reflected in the fact that many top scientists do not stay in Slovakia, but leave abroad. At the moment, Slovak Republic is also seeking, through increased financial support, to get these scientists back to participate on Slovak research, but also to educating the young generation of scientists.

Support for research and development of agriculture is in the conditions of Slovak Republic at the level of funding of social and human sciences, but it does not reach the level of support of technical and natural sciences. Such under-funding in this area also leads to the fact that innovations only to a very limited extent penetrate into the agricultural sector, which greatly reduces the competitiveness of Slovak agriculture in the European area.

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FOREIGN LANGUAGES IN A BUSINESS CONTEXT

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Abstract

Nowadays, especially small and medium – sized enterprises (SMEs) are aware of the fact that insufficient knowledge of foreign languages can have a negative impact on their efficiency to trade as well as to engage in cross-border and global activities. On the one hand, English is a lingua franca of the global trade, but, on the other hand, enterprises also tend to use other world languages or regional and minority languages for their business prospects. In order to be more competitive internationally, SMEs invest into language management strategies which help them cope with the lack of language skills. There are a lot of projects and surveys conducted by the institutions of the European Union focused on the link between language and the economy. The main aim of the survey was to find out what the students of the Slovak University of Agriculture in Nitra think about the importance of foreign languages in a business context.

Keywords: *business context, language management strategies, questionnaire, regional and minority languages, world languages*

JEL classification: *J24, M53*

1   Introduction

Active knowledge of foreign languages is crucial not only for individuals but also for enterprises because those ones operating in the international environment very often face problems which are directly connected with the lack of language skills. Mainly small and medium-sized enterprises (SMEs) are familiar with the fact that poor command of foreign languages, e.g. inaccurate translation of

business deals, can lead to financial losses. According to the ELAN study (European Commission, 2006, p. 5), "The survey of SMEs found that a significant amount of business is being lost as a result of lack of language skills. Across the sample of 2000 businesses, 11% of respondents (195 SMEs) had lost a contract as a result of lack of language skills. […] 37 businesses had lost actual contracts which together were valued at between € 8 million and € 13.5 million. A further 54 businesses had lost potential contracts worth in total between € 16.5 million and € 25.3 million. At least 10 businesses had lost contracts worth over € 1 million." Therefore, enterprises should pay more attention to language skills of their employees and support them not to learn only English but also other world languages as well as regional and minority languages because the staff´s language competence can often influence the choice of future markets. Thus, with good language skills, multilingual companies can expand their business to international markets and become more competitive.

Nowadays, English is considered to be a lingua franca in the international business world. The results of the ELAN study (European Commission, 2006) confirm this fact. The participants of the survey (SMEs) "indicated that they viewed English as a key language for gaining access to export markets and frequent reference was made to its use as a lingua franca. […]" (European Commission, 2006, p. 6). As for large companies, English "appeared to be more extensively used as an intermediary language than was the case with SMEs, possibly reflecting its use as an intermediary language in many multinationals" (European Commission, 2006, p. 7). Also the findings of the PIMLICO case studies (European Commission, 2011a, p. 16) indicate that English "is, and continues to be, the dominant language of global trade."

But on the other hand, the same studies and surveys (European Commission, 2006 and European Commission, 2011a) revealed the importance of other languages which are commonly used for different markets. For example, the PIMLICO study (European Commission, 2011a) highlights the fact that other languages are often used for business communication because there are many markets where English does not suffice, e.g. Latin America where some Spanish is required. Regional languages are more often used for everyday business communication as well, for example Catalan, Welsh and Basque. The findings of the ELAN study (European Commission, 2006) also point out that apart from English, other languages are employed by companies especially when they want to establish long-term business partnerships with new clients, for example Russian is used in Eastern Europe as a lingua franca, French is used to trade with enterprises from some areas of Africa and Spanish is used in Latin America.

Also other studies and projects emphasize the importance of including other world languages, and regional and minority languages in SMEs strategies with the aim of achieving successful results across borders, e.g. The Network to Promote Linguistic Diversity2020 [NPLD2020] (2015), The Network to Promote Linguistic Diversity.eu [NPLD.eu] (n.d.) or European Communities (2008). Knowledge of different foreign languages is, for enterprises, crucial because "in large parts of Europe English is already considered more as a basic skill than a foreign language [… and therefore] the need to maintain the advantages by moving beyond English will be felt more acutely "(European Communities, 2008, p. 8). Thus, good multilingual communication helps SMEs open up opportunities that can make them more competitive internationally, and all languages including "lingua francas, state languages, regional, minority and migrant languages […] can also boost the local, national or international economies" (NPLD2020, 2015).

The above mentioned NPLD2020 project (NPLD2020, 2015) was designed to promote the necessity to communicate in several languages in SMEs´ day to day business and to help them integrate "regional and minority languages in [their] strategies in order to achieve successful results" (p.3). The project was aimed at SMEs because "micro, small and medium-sized enterprises are socially and economically important in Europe [and] […] they represent 99% of an estimated 19.3 million enterprises in the EU and provide around 65 million jobs representing two-thirds of all employment" (World Bank statistics, n.d. cited in NPLD2020, 2015, p.9). And therefore, if SMEs want to be successful in establishing a good relationship with their cross border clients or suppliers, the active use of customer´s language can be critical in many specific situations, e.g.:

- undertaking market research, or advertising and launching publicity campaigns abroad;
- managing and training multilingual workforces at home or abroad;
- providing customer care abroad;
- handling local documentation;
- showing respect for cultural differences;
- demonstrating a long- term commitment to a foreign market;
- establishing a positive rapport and sense of trust with company´s major clients, etc. (European Union, 2011, p.5; NPLD2020, 2015, pp.11-12).

In order to promote linguistic diversity in Europe, a lot of issues have to be taken into account at company level, at national level, at regional level and at European level as well, e.g.:

- Businesses should use a wide range of language strategies and revise recruitment policies (more emphasis on individual language competence of employees);
- Governments should include language training into lifelong learning programmes and provide appropriate recognition for language skills in language certificates;
- Regional and local authorities should support cooperation between local business communities and universities and other training institutions which can help enterprises improve their language strategies;
- European institutions should emphasize the importance of languages for competitiveness and gather information about different community programmes which support languages for business as well as information about good examples of projects (European Communities, 2008).

As for businesses, they should implement language management strategies into their day to day practices to be more competitive globally. According to the results of case studies undertaken by the European Commission (2011b), the best multilingual business strategies used by SMEs, global companies and pan-European companies can be divided into three main categories: (1) *staff and strategic issues* – recruiting multilingual staff; hiring local staff; multilingual business meetings and corporate languages; etc.; (2) *language management and learning* – use of language resources; corporate language training and learning; assistance from external companies with translation and interpretation; etc. and (3) *ICT and multilingualcommunication* – multilingual internet and intranet websites; integration of multilingual online devices; etc. Similar language management strategies were also identified by NPLD2020 (2015): native-speaker recruitment; language training; cultural training; high-quality interpretation and translation; use of local agents; use of linguistic audits; link with local universities; multilingual internet website; multilingual intranet devices; e-commerce involving multilingual operations; translation of promotional, sales and other technical material; etc. In short, multilingual business practices take place at different levels in organizations and are closely related to specific activities of individual corporate departments.

On the one hand, companies should invest into appropriate language management strategies in order to become more competitive, e.g. they can organize language training for their staff, but on the other hand, they also have to motivate their employees to learn foreign languages. There are several methods how employees can be motivated, e.g.:

- language training for staff within the premises of companies paid by companies;

- bonuses for active knowledge of three foreign languages;
- cooperation on international projects;
- staff mobility;
- organizing language courses during working hours;
- organizing educational courses;
- providing employees with money for buying study materials; etc. (Schöne, 2013).

As mentioned above, language management strategies of companies should be supported by businesses themselves, but also by governments, regional and local authorities, and by European institutions. There are several examples of projects aimed at improvement of language skills of employees. One of them is the project "*Jasne- Alles Klar*!" (01.2014 - 03.2016) whose main participants were the companies operating in automobile industry, their suppliers and companies dealing with logistics and transportation. Firstly, the requirements of selected companies were gathered in order to identify their language needs (e.g. which situations the companies use the language in; what the companies take into account when assessing language skills and if the companies support language training of their employees). Secondly, profiles of language competences for heads of financial and other departments, main constructors, engine drivers and long distance drivers were identified and finally, learning modules in German, Polish, Czech and Slovak were designed (Programm für lebenslanges Lernen, n.d.). The findings of the questionnaire, which was also distributed to target companies, revealed that in the region Poland – Germany – the Czech Republic – Austria – Slovakia, German is used together with English in everyday business communication. It is also surprising that in Germany, employees with language skills in Polish are demanded. But on the other hand, only a few German companies reported their need for Czech and Slovak (Schöne, 2013).

In November 2017, a survey was conducted by the authors of the article. Its main aim was to find out how the students of the Slovak University of Agriculture in Nitra (SUA in Nitra) perceive the necessity of active knowledge of foreign languages in a business context. The survey was undertaken in order to complement the findings of the survey on language skills needs of Slovak small, medium-sized and large enterprises (Holúbeková &Fördösová, 2017).

2   Data and methods

The main tool used for collecting information about the students´ opinion on the use of foreign languages in a business context was an anonymous questionnaire.

The questionnaire was sent online to 60 students of the Slovak University of Agriculture in Nitra, who, at the time of the survey – November 2017, studied Russian at the Department of Languages. 42 students (60% of the total sample) completed its 14 close-ended questions. Questions 1-7 were aimed at respondents´ background and Questions 8-14 were focused on determining the students' opinion on the use of foreign languages in a business context. We were interested in the following pieces of information:

- if students think that knowledge of foreign languages is crucial for enterprises because of their overall performance and better competitiveness in the global market;
- if they think that English is a lingua franca in the world of international trade;
- if they think that it is necessary for enterprises to use not only English but also other world languages to become more successful internationally;
- if they think that it is necessary to use regional and minority languages in day to day business communication especially when communicating with foreign clients and suppliers;
- which language strategies should be used by enterprises in order to become more competitive in the international market;
- if they agree with the claim that active knowledge of foreign languages can prevent enterprises from financial losses;
- which types of motivation should be used by enterprises to encourage their staff to learn a foreign language/foreign languages.

The obtained data were further statistically processed.

3   Results and discussion

The respondents of the questionnaire were 42 students of the Slovak University of Agriculture in Nitra. Within Question 1, they had to mark which secondary school they attended. The results are as follows:

a) Grammar School – 32.6%;
b) Business Academy – 18.6%;
c) Secondary Technical School – 11.6%;
d) Secondary School of Electrical Engineering – 9.3%;
e) Hotel Academy – 7%;
f) Secondary School of Civil Engineering – 7%;
g) Others – 13.9%.

Across the sample of 42 respondents, at the time of the survey – November 2017, 83.2% of them were the students of the Bachelor´s Degree programmes

and 16.7% of them were the students of the Master´s Degree programmes at the University.

Question 3 was aimed at finding out which faculty of the SUA in Nitra the respondents studied at. The following results were recorded:

a) Technical Faculty – 57.1%;
b) Faculty of Economics and Management – 23.8%;
c) Faculty of European Studies and Regional Development – 7.1%;
d) Faculty of Biotechnology and Food Sciences – 7.1%;
e) Faculty of Agrobiology and Food Resources– 4.8%;
f) Faculty of Horticulture and Landscape Engineering -0%.

It is worth reporting that 64.3% of the respondents had been studying Russian for 1-2 years, 16.7% for 5-6 years, 11.9% for 3-4 years and 7.1% for more than 7 years.

Apart from the Russian language, the respondents claimed that they can also speak the following languages:

a) English – 92.9%;
b) German – 28.6%;
c) French – 4.8%;
d) Spanish – 4.8%;
e) Italian – 2.4%;
f) Chinese – 2.4%;
g) Others – 7.1%.

The responses to Question 6 show that in the future, the respondents would like to work for the following sectors of economy (written according to students' preferences):

a) Tertiary sector – 34.8%;
b) Secondary sector – 28.3%;
c) Quaternary sector – 26.1%;
d) Primary sector – 10.9%.

As for the size of the enterprise, the respondents would like to work for a small enterprise (42.6% of our respondents), a medium-sized enterprise (25.5% of our respondents) and a large enterprise (25.5% of our respondents).

All the respondents think that active knowledge of foreign languages is crucial for companies because of their overall performance and better competitiveness in the global market.

On average 81% of the respondents in the sample believe that English is a lingua franca in the world of the international trade but 16.7% of them disagree with

the statement that English is the main language used in the international market and only 2.4% of our respondents do not know.

On the other hand, a significant percentage of respondents, 73.8% of the total sample, admit that for companies, it is necessary to use other world languages in order to be successful on the international scene. Active use of other world languages in foreign markets is not important for 11.9% of the students and 14.3% of the respondents do not know if other world languages are significantly important for doing business internationally.

As for regional and minority languages, 48.8% of the respondents claim that the ability to speak them can be a sign of companies´ willingness to trade directly in another country and knowing the language spoken there can be the first step in opening up a new, and very often unknown, market. But 32.6% of the students have not answered the question and 18.6% of them do not realize the advantage of speaking regional and minority languages when trading with foreign markets.

Figure 1 **Language strategies**

Source: Own processing, 2018.

Figure 1 shows that main language strategies which should, according to the respondents, be used by companies in order to become more competitive in the international market are (written in the order of importance):

a) Language training for employees within the premises of companies (paid by companies) – 71.4%;
b) Staff mobility – 38.1%;
c) Cooperation with universities – 33.3%;
d) Language training for employees outside the premises of companies (language courses organized by language schools and paid by companies) – 31%;
e) Recruiting staff with language skills – 26.2%;
f) Multilingual websites – 21.4%;
g) Employing professional translators and interpreters – 11.9%;

h) Language training for employees outside the premises of companies (paid by employees) – 9.5%;
i) Recruiting native speakers – 7.1%;
j) Extra money used for buying study materials (course books, dictionaries, on-line courses, etc.) – 7.1%.

The large majority of our respondents (71.4% across the sample) agree that active knowledge of foreign languages can prevent companies from financial losses. Only a small percentage of those questioned (4.8%) believe that the lack of language skills cannot influence companies´ financial situation and 23.8% of the respondents do not know if companies´ losses and the lack of language skills are really interconnected.

Figure 2 **Motivation**

Source: Own processing, 2018.

Figure 2 shows that, according to the respondents, the following types of motivation should be used to encourage staff to learn a foreign language (written in the order of importance):
a) Monthly bonuses after finishing a language course (a certificate required) – 42.6%;
b) Staff mobility – 20.4% of respondents;
c) Fringe benefits for active knowledge of two and more foreign languages – 14.8%;
d) Monthly bonuses for active knowledge of two and more foreign languages– 13%;
e) Extra money an employee receives after finishing a language course (a certificate required) – 9.3%.

3   Conclusion

To sum it up, languages play an important role in everyday business activities of companies. Knowledge of foreign languages can lead to their successful performance in international markets and increased competitiveness because multilingual companies have a comparative advantage when selling their products and services abroad. Apart from English, which is still a lingua franca of global trade, other world languages (German, Spanish, Russian, etc.) and regional and minority languages (e.g. Basque, Catalan or Welsh) are used by companies when communicating with suppliers, customers or foreign subsidiaries. In order to increase their multilingualism, enterprises try to include different language management strategies into their business practices, e.g. language training for employees, hiring staff with language skills, hiring native speakers, multilingual internet and intranet websites, cooperation with universities, etc.

A survey was conducted by the authors of the article in order to find out how the students of the Slovak University of Agriculture in Nitra are familiar with the issue of languages in the business environment. From the results gathered in the survey, it can be concluded that all the respondents think that knowledge of foreign languages is important for companies in today´s global world. According to the findings of the ELAN study (European Commission, 2006) and the PIMLICO case studies (European Commission, 2001a), English is considered to be a lingua franca in the business environment. But on the other hand, their results confirm the fact that active knowledge of other world languages, regional and minority languages is similarly crucial for companies' successful performance abroad. Also participants of our survey (81% of our respondents) believe that English is still a lingua franca of international trade but, at the same time, they are aware of the necessity to employ language skills in other world languages (73.8% of our respondents) and regional and minority languages (48.8% of our respondents) into everyday business life.

Our findings also show that following language management strategies should be employed by enterprises in order to improve their multilingual business practices: language training for employees within the premises of companies paid by companies (71.4% of our respondents); staff mobility (38.1% of our respondents); cooperation with universities (33.3% of our respondents); language courses for employees organized by language schools outside the premises and paid by companies (31% of our respondents); recruiting staff with language skills (26.2% of our respondents), etc. The results of the studies undertaken by the European Commission (2011b) and NPLD2020 (2015) also put emphasis on the fact that

using different language management strategies can help companies achieve better access to foreign markets.

On the other hand, enterprises should use different ways of motivating their employees to make them learn foreign languages (Schöne, 2013). The main ones, according to the participants of our survey, are: monthly bonuses after finishing a language course (42.6% of our respondents); staff mobility (20.4% of our respondents); fringe benefits for active knowledge of two and more foreign languages (14.8% of our respondents); monthly bonuses for active knowledge of two and more foreign languages (13% of our respondents) or extra money an employee receives after finishing a language course (9.3% of our respondents).

To conclude, according to surveys and studies mentioned in the article as well as according to the participants of our survey, multilingual competence of enterprises (and especially SMEs) is important for them because those companies which invest into appropriate language management strategies are more likely to perform properly in the international market. Therefore, a further survey investigating the relationship between language management skills and performance of (Slovak) SMEs in the international market is needed and will be conducted by the authors of the article in the future.

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COMPARISON OF ANGLICISM USE ON COMPANY WEBSITES IN SELECTED LANGUAGES

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Abstract

In the era of globalization the increased growth of the international flow of goods and services, labour force, capital, technology and culture is evident. Apart from the political and cultural globalization, the economic globalization means the economic process of integration. Along with the economic development the languages undergo the significant changes as well. The English language has become the "lingua franca". Many other languages use the English words, expressions or collocations for the denomination of some phenomena, in particular in marketing. The objective of our paper is to compare the use of Anglicisms on some company websites in the Slovak, German, Russian and Spanish languages.

Key words: *Anglicisms, foreign languages, comparison, marketing, company websites.*

JEL classification: *I23, M31, F18, Z19*

1   Introduction

In the recent years the Internet has become the significant advertising platform which does not serve only for the dissemination of information about companies and products. We cannot imagine the classical forms of advertising without the reference to the company websites. The high-quality website is the prerequisite for the successful online-marketing and the optimal presentation of a firm. It is

important that the website is informative with an appropriate number of items of relevant information, and also attractive and well arranged.

The consumer´s first impression of the company is formed during the first click on the website and it is influenced by several factors. The professional design along with the special layout and multimedia content play an essential role. Next, the apt texts and up-to-date information as well as the website usability are also vital.

Last but not least fact in the process of website formation is the language. The short sentences, neutral language style without many professional terms or slang expressions are being preferred. The frequent phenomenon is the use of Anglicisms. Unlike the language of advertising, the motivational factors for using Anglicisms on the official company websites are often different. Concerning advertising, their role is to increase the attractiveness of advertisements and, thanks to their short form, to contribute to the language economization while on the company´s websites they often represent the terms of the particular specialization of the company. It is obvious that the company tries to address its target group of customers via the language. The origin of the company has also a considerable impact on the use of Anglicisms. The multinational companies, which are established in many countries, use the English language standardly. However, the extent of the English borrowings is not the same in all languages. Despite the Anglicisms are being used in all European languages, they have not entrenched to them at the same level. Therefore, the goal of our paper is to compare the companies´ websites in the different language versions (in particular Russian, German, Spanish and Slovak) and answer the question in which language the Anglicisms are being used most frequently.

1.1   Definition of basic concepts

Language is considered a social phenomenon. As it was being formed under certain conditions and needs of social life, it is dependent on the society using it, which means that it has connection with a particular language community, with its culture. If we perceive the mankind as a complex of the organized social units, it is obvious that it cannot do without certain means of control and intercommunication (Moravcová – Maďarová, 2014). Due to the continuous process of globalization and internationalization, the English language has been strengthening its position as a means of communication almost in all areas of human activity.

The English language received the ascription `lingua franca` thanks to the globalization and it has become the official or dominant language for two milliard people in 75 countries of the world. According to the British Council, the number of users of English as the second language most likely exceeds the number of the

native speakers. English as a foreign language is spoken by 750 million of people. The latest research from the British Council predicts that the number of people actively learning English around the world is set to exceed 1.9bn by 2020 (International House London, 2018). There is no doubt that English is an important and one of the most influential languages, which is also reflected in an increasing number of English words penetrating into other languages.

Borrowing words from other languages is a productive word-formation process used to denote new concepts characteristic for the particular branches of science, technology and production. Nowadays, this process is very commonly used to enrich both general and professional vocabulary of a particular language. Ološtiak (2017) stresses that no modern language can be resistant to the borrowings. Borrowing is related to the contacts of the individual language communities in all fields of life – social, political, cultural, scientific, technical, etc. The reasons for the acceptance of foreign words or expressions are:

- the absence of the domestic equivalent (*know-how*);
- systemic advantages of a loanword compared with the domestic expression (e.g. *softvér*, *hardvér*);
- enrichment of the synonymic series (e.g. *manažér*, *director*);
- pragmatic factors – exclusivity and hipsterism (e.g. *blogge*r, *job*).

In literature we come across different terms related to the linguistic borrowings. To avoid the ambiguity in their use we follow the classification proposed by Capuz (2009) who ranks the linguistic borrowings into the following categories: formal (both graphic and phonetic), morphological, semantic, lexical, syntactic, phraseological, and pragmatic. In our paper we will focus our attention on the lexical borrowings as they represent the most frequent type of transference between languages. The author distinguishes ***loanwords,foreign words,a loan translation*** or ***calque*** and ***loanblends*** or ***hybrids****,* a mingling of both means. The loanword is a word taken from another language and at least partly naturalized (e.g. *líder, móvil*). The foreign word is a word taken from another language, pronounced and written as alien (e.g. *newsletter*, *blockchain*). The calque means the literal translation, e.g. "computer network"   *počítačová sieť*, "highlighter"   *zvýrazňovač*. The examples in Russian are, for example, *меню, диск, вирус, ланч, кредит, смокинг* and *джинсы*. The loanblends or hybrids are the words consisting of the parts originated from the different languages (e.g. *Hightech/industrie* – English/German, lifestyle produkty – English/Slovak, *lider/azgo* – English/Spanish).

There are the different types of linguistic borrowings as every modern language has been influenced by other languages in the process of its development. Today the most important and influential borrowing is an ***Anglicism***.

In general, an Anglicism can be defined as a word, idiom, or characteristic feature of the English language occurring in or borrowed by another language. More precisely, it is "*a direct borrowing from English, a foreign word that has been borrowed through English and a loanblend containing an English element*" (Jesenská, 2007, p. 50).

Katreniaková (2002) states that the Slovak language borrows mostly those words which are being used in the international context and most of them are Anglicisms. There are several reasons for borrowing the professional terms in Slovak. Firstly, there are out-of language factors such as cultural impact of a foreign language, contacts of the particular countries, an increased interest in the study of a certain language, the authoritativeness of the dominant language, historically based interest in the culture of a certain country and the level of the language culture of social class accepting new words. Secondly, we have to take into consideration the language factors: sometimes the Slovak denomination does not exist so it has to be borrowed from other language. Then there is a tendency to replace a long term by a shorter one, the requirement of accuracy and definiteness, and also the necessity to distinguish the existing meaning of the word. In other cases the reason can be the impossibility of Slovak terms to form the derivatives and the fact that a foreign word does not evoke undesirable associations in comparison to its Slovak equivalents.

The Russian language is very eager to accept Anglicisms. Svirenkova (2017) claims that about 3/4 of all loan-words in Russian are represented by Anglo-Americanisms. This phenomenon can be explained by the rapid changes in the social and scientific life. Several factors enhanced the development of this process, in particular – the Internet, ICT, development of the world market and economy. This author clarifies the reasons as:

- the general tendency to make the vocabulary more international;
- the necessity to denominate new objects and notions (ноутбук, органайзер, сканер);
- the absence of the exact word in Russian (спонсор, спрей, дайджест, виртуальный);
- the necessity to express polysemous designations (пиллинг-крем);
- the complementarity of the language by stronger expressions (имидж, прайс--лист, шоу);
- the acceptance of a foreign word as more prestigious (презентация, эксклюзивный);
- the necessity to make more specific the word meanings (сэндвич, гамбургер, фишбургер, чисбургер, чикенбургер).

As to the Spanish and German languages, the reasons to take over words from other languages are similar to those presented for the Slovak and Russian languages. The preference for a particular reason depends on the necessities of an individual language as well as on the typological and genetic classifications of languages.

2   Data and Methods

The objective of our research was to determine the use of Anglicisms on company websites in 4 language versions, particularly in German, Russian, Slovak and Spanish. The selected companies represented the different areas of technology and production: SEAT (automotive industry), SAP (IT), Linde Gas (industrial production and technical gases), Maybelline and Nivea (beauty industry). As the Anglicisms are considered to be the most widespread type of borrowings, we wanted to verify their usage by choosing the companies operating in the different sectors.

Our research was based on the following research questions (RQ) and hypotheses (H):

RQ1: *Is the share of Anglicisms on a website of a particular company the same in all language versions?*

When formulating a hypothesis, we supposed that the language belonging to Germanic languages would present a higher tendency to take over more Anglicicsms than Slavic and Romance languages:

H1: *The percentage of anglicisms in German is higher than in Russian, Slovak and Spanish.*

The second research question was as follows:

RQ2: *Is the use of Anglicisms on company websites influenced by the area in which a particular company operates?*

We assumed that companies operating in the same area would use Anglicisms equally or their share would be very similar. Therefore, we chose 2 companies from the beauty industry (Maybelline and Nivea) and we formulated the following hypothesis:

H2: *The difference in a percentage share of Anglicisms on a website of Maybelline is not higher than that on a website of Nivea.* This hypothesis will be confirmed if the difference in the percentage is not higher than 1%.

As to the methods, in our research we used the methods of the excerption of materials from the internet sites, comparison and qualitative-quantitative linguistic analysis.

The research was based on the excerption of Anglicisms, which was carried out separately for each company website in all language versions. Consequently, the results were analyzed and compared in order to determine the language and the company which used Anglicisms the most frequently.

We excerpted 368 Anglicisms out of which 158 were used in German, 87 in Spanish, 68 in Russian and 55 in Slovak. The corpus of Anglicisms was analysed by the means of qualitative-quantitative analysis and divided into two groups. The first group consisted of pure Anglicisms and the second group included all other types of Anglicisms found in the corpus, particularly, adapted Anglicisms, loan translations (calques) and loanblends (hybrids). They were classified in one group due to their low appearance on websites. To achieve a clear representation of results, the obtained data were analysed and presented in the form of tables and vertical bar graphs.

3   Results and discussion

As it has been mentioned above, Anglicisms were classified into two groups. In the following tables (Table 1 and Table 2) we present the percentage of Anglicisms used in the particular languages on company websites of the selected companies.

Table 1 **Pure Anglicisms (%)**

	Pure Anglicisms				
	German	Russian	Slovak	Spanish	Total (by company)
SEAT	1.84%	4.12%	0.49%	0.40%	6.85%
SAP	5.22%	1.73%	3.40%	3.19%	**13.54%**
Linde Gas	1.40%	0.65%	0.49%	0.38%	**2.92%**
Maybelline	5.70%	0.87%	1.58%	4.76%	12.91%
Nivea	1.11%	2.10%	1.63%	0.44%	5.28%
Total (by language)	**15.27%**	9.47%	7.59%	9.17%	

Source: Own processing, 2018.

Table 1 presents the percentage of the pure Anglicisms. If we summarize the percentage of the Anglicisms used in every language separately on all company websites, we come to the conclusion that the highest percentage of the pure Anglicisms was used in German (15.27%) and the lowest in Slovak (7.59%). Russian and Spanish languages borrowed similar percentage of the pure Anglicisms (9.47% and 9.17% respectively). Concerning the individual companies, the pure Anglicisms were used significantly by SAP (13.54%) and Maybelline (12.91%).

On the other hand, there were only 2.92% of pure Anglicisms in all language versions on the web site of Linde Gas.

Table 2 **Other types of Anglicisms (%)**

	Other Types of Anglicisms				
	German	Russian	Slovak	Spanish	Total (by company)
SEAT	0.19%	0.00%	0.00%	0.13%	0.32%
SAP	0.00%	0.82%	0.12%	0.86%	1.08%
Linde Gas	0.11%	0.22%	0.16%	0.25%	0.74%
Maybelline	0.13%	1.05%	0.53%	1.49%	**3.2%**
Nivea	0.14%	0.53%	0.15%	0.29%	1.11%
Total (by language)	0.57%	**3.7%**	0.96%	**3.2%**	

Source: Own processing, 2018.

Table 2 shows the percentage of other types of Anglicisms, including adapted Anglicisms, calques and hybrids. As we can see, Russian (3.7%) and Spanish (3.2%) use other types of Anglicisms the most. On the other hand, the German language almost does not adapt Anglicisms (0.57%) to its grammar, orthography or pronunciation.

When comparing the use of the pure and other types of Anglicisms we can observe a significant difference in the percentage of their use. It should be stated that the process of adapting borrowings takes a long time, so it may influence the results as well. On the other hand, a lot of professionals and specialists make use of the pure Anglicisms because it is more convenient to use them than to look for their possible equivalents in their mother tongue. Another reason for their incorporation is the exclusivity, hipsterism or even false prestige; or professionals use them to make the specialized vocabulary they use more international. The pure Anglicisms should be used appropriately, it means, when they are needed as their excessiveness and inappropriate use can lead to the difficulties in the course of communication.

Concerning the individual companies providing their websites in the selected languages we came to the interesting conclusions which are represented in the following graphs:

Graph 1 **SEAT - The use of Anglicisms in all language versions (%)**
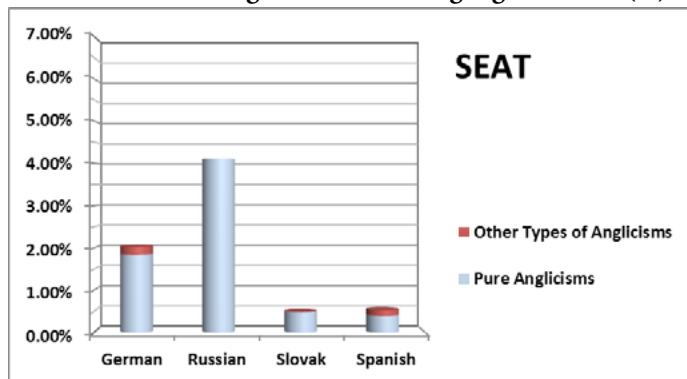
Source: Own processing, 2018.

SEAT is a Spanish car company, therefore it is not surprising that it almost does not use Anglicisms on their Spanish website (0.53%; pure Anglicisms - 0.40%, other types of Anglicisms - 0.13%). On the other hand, the Russian website includes only pure Anglicisms (4.12%), so there is no tendency to adapt Anglicisms to the norms of Russian language. In comparison with the other companies, it is the highest share of the pure Anglicisms on the Russian websites.

Graph 2 **SAP - The use of Anglicisms in all language versions (%)**
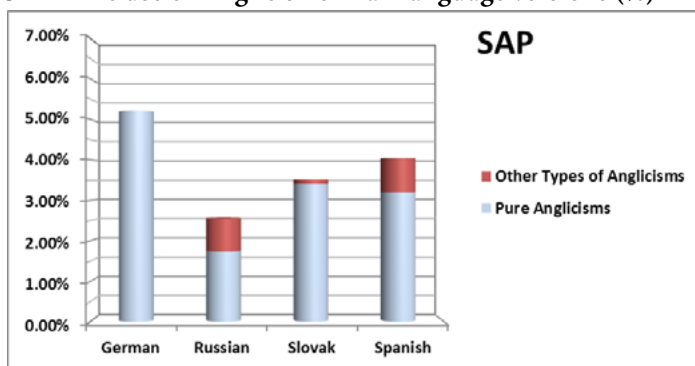
Source: Own processing, 2018.

The computer company SAP makes a considerable use of Anglicisms on their company websites (14.62%), particularly the use of the pure Anglicisms (13.54%) is the highest when comparing with the websites of the other companies. The Slovak language borrows the highest share of pure Anglicisms (3.19%) of all Slovak

websites. The German website uses only the pure Anglicisms (5.22%), the rest of language versions include also other types of Anglicisms, mainly Russian (0.82%) and Spanish (0.86%) websites. Concerning other types of Anglicisms, the Spanish language uses mainly hybrid expressions (eg. *liderazgo, curso on-line, spotlight del moderador, showcases de desarrolladores*).

In our opinion, some pure Anglicisms (e.g. *life business, course, education, development*) used in all language versions are unnecessary due to the existence of their equivalents in particular languages. As SAP is a computer company, the excessive use of the pure Anglicisms may be related to the field of Information Technologies, which is characteristic for its willingness to accept English borrowings. Moreover, many IT companies are international companies and English is their means of communication. Therefore the influence of English is so significant.

Graph 3 **Linde Gas - The use of Anglicisms in all language versions (%)**
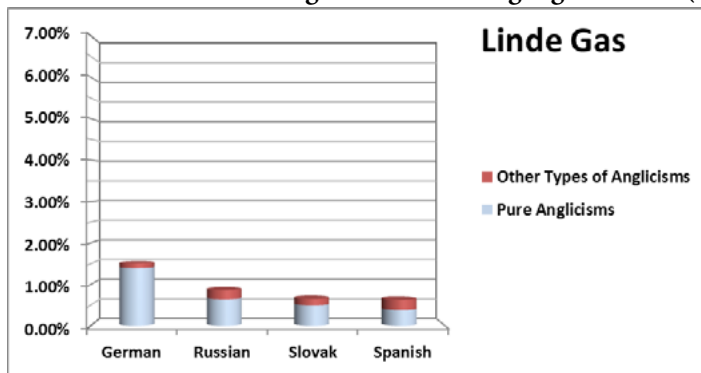
Source: Own processing, 2018.

Linde Gas is a company dealing with an industrial production and technical gases. It is a very specific area of human activity, which may be the reason why their company websites use the least percentage of Anglicisms (3.66%; pure Anglicisms - 2.92%, other types of Anglicisms – 0.74%) of all selected companies. As we can see, the websites in Russian, Slovak and Spanish languages include similar share of pure (0.65%, 0.49% and 0.38%) as well as of other types of Anglicisms (0.22%, 0.16%, and 0.25%). The German language borrows 1.40% of the pure Anglicisms but similar percentage of the other types of Anglicisms (0.11%) as other languages.

Graph 4 **Maybelline - The use of Anglicisms in all language versions (%)**
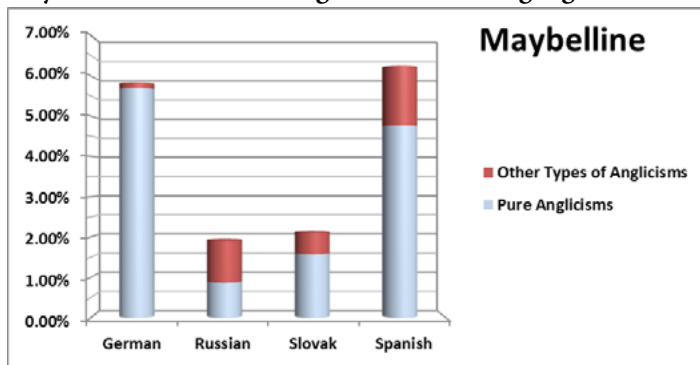
Source: Own processing, 2018.

The cosmetic company Maybelline uses the highest share of Anglicisms (16.11%; pure Anglicisms: 12.91%, other types of Anglicisms 3.2%) of all selected companies. Concerning the particular language versions, we can see that the German language borrows the highest share of the pure Anglicisms (5.70%) while Russian only 0.87%. The German language also achieves a high total percentage (5.83%); however, this number consists of 5.7% of the pure Anglicisms and 0.13% of the other types of Anglicisms. The German website is a good example of an excessive and inappropriate use of Anglicisms, which may lead very easily to misunderstandings and communication problems: eg. *Ob **Make-up Innovationen, Hot Trends**, Gewinnspiele oder **Beauty Looks** – mit unserem **Newsletter** bist du immer **up to date**. Du willst deine **Make-up Skills** auf das nächste **Level** bringen? Dann entdecke die exklusiven **Make-up Artist** Produkte von Maybelline. Nur **online** und in ausgewählten **Stores**.*

The Spanish website uses totally the highest share (6.25%) of pure (4.76%) and the other types of Anglicisms (1.49%), mainly hybrid expressions (e.g. bo*ost de hidratación*, *labial semi mate*). The Slovak website presents the highest percentage of other types of Anglicisms (0.53%), including adapted Anglicisms (e.g. *mejkap, bestseller*) and calques (e.g. *tónovací krém, zvýrazňovač*).

Graph 5 **Nivea - The use of Anglicisms in all language versions (%)**
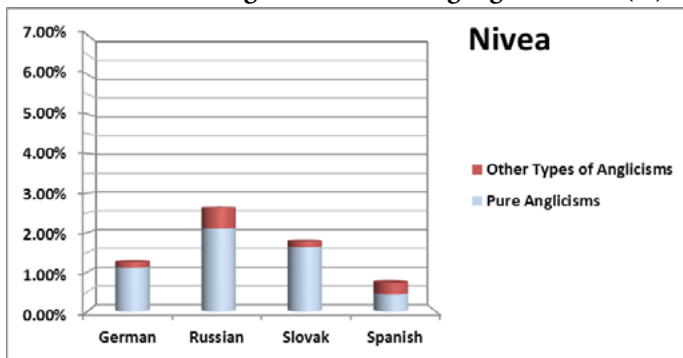
Source: Own processing, 2018.

The cosmetic company Nivea is the second company with the least percentage of Anglicism (6.39%; pure Anglicisms – 5.28%, other types of Anglicisms – 1.11%) on their websites. If we look at individual languages, we can see that Russian language accepts the highest percentage of pure (2.10%) as well as other types of Anglicisms (0.53%). On the other hand, the Spanish website includes only 3 (0.44%) pure Anglicisms (*roll-on, after sun* and *newsletter)* and 2 (0.29%) hybrids (*desodorante en spray* and *spray solar*).

It is interesting to compare the use of Anglicisms on the company websites of Maybelline and Nivea. Both are cosmetic companies, thus, we would expect the similar results and not such a significant difference in the use of Anglicisms. In our opinion, it is caused by focusing on the different groups of target customers. Maybelline is focused mostly on youth, therefore, the use of Anglicisms is so high. On the other hand, Nivea is oriented at a wider age group of customers, so, an excessive use of Anglicisms could cause communication problems.

Our research indicated that the Slovak language often accepts the Anglicisms either in the original writing and spelling (e.g. *bestseller*) or the writing is adapted to our mother tongue and the pronunciation is the same like in English (e.g. *díler*). One of the reasons is the use of the similar alphabet. In the advertisements we came across the dual types of borrowings (e.g. *Cloudová platforma/ Cloud platform*). The Russian language tends to borrow many Anglicisms. The hybrids are very frequent (e.g. *марка SEAT*). This language also uses many words with the original pronunciation written in the Cyrillic alphabet (e.g. *хайлайтер, Хэллоуин*). Based on our research we can assert that the Russian language tends to combine Russian along with English expressions as well as English alphabet with the Cyrillic alphabet. Although the Spanish language borrows a considerable

number of the pure Anglicisms, it tends to adapt them in the form of adapted Anglicisms (eg. *móvil, líder*) and hybrids (e.g. *proceso know-how, plataforma cloud*). On the other hand, the German language adopts almostly the pure Anglicisms.

Concerning hypotheses, based on the obtained data we can conclude that the first hypothesis was confirmed as the German language borrows the most Anglicisms of all languages (15.84%: pure Anglicisms - 15.27%, other types of Anglicisms - 0.57%). On the other hand, the second hypothesis was not confirmed as the difference between the use of Anglicisms by Maybelline and Nivea was higher than 1%, particularly the difference was 10.72%. Therefore, we assume that the area in which the company operates is not significant in determining the preference for the use of Anglicisms. A more decisive element is the target group of customers whom a company wants to address.

To sum up, it may be stated that all studied languages prefer to borrow the pure Anglicisms. The highest number occurred in the German language – 152 words on the webpages of five multinational companies. The lowest number (49) was accepted by Russian. On the other hand, Spanish borrowed the highest number of the other types of Anglicisms (21), while Slovak took over only 5 words. One of the reasons may be that it is much easier to borrow already created terms together with the concepts they denote than to adapt them to the norms of an accepting language. The tendency to borrow Anglicisms is also related to the approaches in the different languages towards borrowing words from other languages.

Ondrejovič (2015) claims that in the process of acquisition the Anglicisms are the subject of so called `word market` in the Slovak language as well as in other languages: only those words can be retained where there is a demand for them in the accepting language.

Concerning the Slovak language, some purists point out at the threat of immoderate number of Anglicisms in Slovak, such as unneeded expressions, can mean the violation of stability and identity of our mother tongue. The selection of the loanwords is determined by the communication intentions. On the other hand, the members of the language community dispose of the natural regulatory mechanisms of taking over foreign elements – including Anglicisms – thus the imperilment of stability and identity of the Slovak language is not real (Dolník, 2010).

The Russian linguists remind the phenomenon of English-Russian bilingualism, which becomes the consequence of "the globalization" of English (Chasapetova, 2016). They are aware of the serious threat of the excessive flow of the foreign words into their language which can lead to the devaluation of the Russian vocabulary. However, they also believe that the language itself is able to get rid of the unnecessary words and expressions.

The German language accepts a relatively high number of Anglicisms. Therefore, there have been discussions about their incorporation into the German language. Some linguists are against their use as they perceive the language as a closed entity. Others think that borrowing words from other languages is a natural process of enriching the vocabulary of accepting language as they consider the language as a living organism which is constantly changing. Spitzmüller (2015) carried out an extensive research focused on the use of Anglicisms in the public discourse in 1990-2001. The results showed a critical approach to the use of Anglicisms by people actively participating in public discourse (e.g. politicians, etc.). The importance of this issue is supported by publishing the Dictionary of Anglicisms which includes 3, 500 English entries in 3 volumes.

The Spanish linguists are also aware of the excessive use of Anglicisms. Although the Anglicisms and other borrowings enrich the Spanish vocabulary with new words and shades of meaning, there is a tendency for their unnecessary and excessive use in some areas of human activity, which, in most of the cases, causes confusion and communication problems. One example is the area of Advertising, which is closely related to Marketing. In the last 12 years the number of companies using Anglicisms in their advertising has increased tenfold. As a response to this situation, the Spanish Royal Academy and the Academy of Advertising have launched a campaign to make people aware of the huge misunderstandings and communication problems which an excessive and inappropriate use of Anglicisms may provoke. The campaign was very successful and a lot of people agreed with this initiative (Ellies, 2016).

4   Conclusion

The contemporary English has a strong impact on other languages, in particular in business, industry and economy. The professional terminology in the particular field of science is created predominantly by the professionals or specialists. The linguists can only express their opinion about the incorporation of a new term into the particular language. The equivalents of the English terms can be also formed by the translation or formation of the denomination in an accepting language which puts well the essence of a notion. At the same time it is vital to take into account the existing terminology. Therefore the professional users – researchers, scientists, managers – of the particular terminology should decide about the extent of lexical borrowings in their vocabulary. The most important thing is to use them reasonably when there is a need for them and avoid their excessive and inappropriate use because of other than linguistic reasons.

The development in different fields of science, technology, production and economy is very fast and every language has to accept a considerable number of borrowings because of the close relation with other languages and cultures. It is necessary to create own terminology or to adopt loanwords denoting new concepts and objects of extra-linguistic reality. It is much easier to take over a loanword than to create its equivalent in an accepting language. However, it is always the course of time that shows us if a particular borrowing has been accepted successfully or not.

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SOCIAL SKILLS AS AN IMPORTANT PILLAR OF MANAGERIAL SUCCESS

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Abstract

The aim of the essay was to draw attention to the fact that the level of expertise and professional skills represents merely a basic prerequisite for success in managerial work. While the expertise and experience have their essential role, they are not enough to achieve excellent results. Based on this fact, we have carried out research examining the relation between the level of social skills in selected agricultural managers and their position in the management hierarchy. The level of social skills was evaluated using Riggio's Social Skills Inventory.

Keywords: *managers, social skills, emotional intelligence, SSI*

JEL classification: *D23, L20, 015*

1   Introduction

Management has recently undergone significant changes. The development of production, its productivity and achieving the state in which supply starts to exceed demand have led to a radical change on the global market. As a result of globalisation of the world economy, competition is growing rapidly and if enterprises wish to retain their competitiveness in the turbulent business environment, they not only need to pay attention to the external environment and respond to it in a suitable way, but also mobilise the entire potential of the internal environment. In order for managers to be sustainably successful, they need to make use of all

possibilities of not only so-called hard, but also soft factors. Social skills of managers may play a crucial role in this complex process.

Empirical research suggests that managers spend as much as 70% of their time interacting and communicating with other people. Without communication, empathy, assertiveness, the ability to motivate, the art of listening and other social skills, managing people cannot be sufficiently effective. Managers come into contact not only with their subordinates, co-workers and colleagues, but as group representatives also with other groups, enterprises and the public, which also puts higher demands on their work.

Various terms are used in specialised literature to refer to social skills. We may find the terms such as social competences, interpersonal competences, soft skills, interpersonal transferable skills, etc.

In recent years, social skills have been linked to other terms – a so-called emotional quotient (EQ) or social quotient (SQ). They are skills that cover the aforesaid skills and give them an appropriate dimension. Their examination was conditional on the fact that also individuals with a high intelligence quotient (IQ) tend to fail in areas where a substantial role is played by interpersonal communication.

2 Theoretical background

According to Goleman (2011), comparing values of IQ with success in professional career has shown the maximum interdependence of 22%. As the author suggests, it has already become quite natural for companies around the world to take into account the emotional intelligence of both their current and future employees in the process of recruitment, promotion and development. As he further states, the Johnson & Johnson company has found that individuals working in divisions around the world who were identified as people with strong leadership potential in their mid-career had by far better emotional intelligence skills than their less prospective colleagues. Pletzer (2009) also suggests that companies working with the concept of emotional intelligence are much more successful on the market than those that pay no attention to these skills in their employees. According to Bradberry & Greaves (2006), emotional intelligence accounts for 60% of the overall success in all types of work. These scientists also found that 90% of all studied high-performing managers were also good at emotional intelligence. On the other hand, high levels of emotional intelligence were found only in 20% of those working insufficiently. Bradberry & Greaves (2006) also state that emotional intelligence skills are applied primarily in management, teamwork, and customer services. They note that such different organisations as L'Oréal and U.S.

Force saved millions of dollars by implementing programmes aimed at improving the emotional intelligence.

In the context of managerial success, Wilding (2010) quotes the American institute, The Center for Creation Leadership, which identified the lack of emotional intelligence as the primary cause of negative turning point in career of top managers. According to the author, research carried out with insurance company employees and IT salesmen has shown that those with good emotional intelligence skills had a 90% greater chance of completing the training and doubling their sales commissions. According to Wilding (2010), an employee with high emotional intelligence is able to:

- Control their emotions.
- Communicate with others effectively.
- Adapt well to changes.
- Solve problems quickly and well.
- Use humour for strengthening mutual trust and understanding in stressful situations.

These employers or employees are also:
- Open and understanding.
- Optimistic also under adverse circumstances.
- Good trainers and sellers.
- Efficient employees in the area of customer claims and complaints.

Wilding (2010) also emphasises that while company human resources specialists consider interpersonal communication skills and other so-called soft skills the most important in job applicants, they are exactly what they lack the most in MBA graduates. Large commercial and economic schools supply the market with graduates with outstanding analytical skills and decent knowledge in the area of finance, marketing and strategy; however, only superficial attention is often paid to teaching soft skills as communication, people management and building team spirit.

Several authors have pointed out the connection between the level of social skills or emotional intelligence and the position rank in the management hierarchy. According to Veber (2000), there is an increasing need for social skills starting from the position of a company manager. According to Goleman (2011), IQ and technical skills represent a much stronger indicator of excellent working qualities in lower positions. Donnelly, Gibson & Ivancevich (1997) introduced a model, according to which technical skills and abilities to master techniques and methods necessary for implementing processes in an enterprise are particularly important at the level of lower management. At the level of middle management,

interpersonal skills, communication and people management skills become more important. Finally, more sophisticated skills such as conceptual strategies, creating visions, communication with the outside environment, responding to opportunities and threats become even more important at the level of top management. Also lifelong learning thus provides individuals with a better perspective and at the same time increases the chances of an organization in which they succeed and differentiate themselves on a global scale (Hallová et.al, 2017).

Figure 1 **Scheme of sophisticated skills in management**

- conceptual strategies, creating visions, communication with the outside environment, responding to opportunities and threats, the ability to manage an enterprise as a system,

- interpersonal skills, people management skills, the ability to communicate and share information top down and vice versa

- technical skills, in-depth knowledge of techniques, methods and practices for implementing processes in an enterprise

Source: Donelly, Gypson, Ivancevich (1997).

In this context, Bradberry & Greaves present an interesting finding. Both come to a conclusion that while the level of EQ generally has a growing tendency from lower to higher management positions, people in top positions may also have lower EQ values. According to the authors, people in charge of the whole organisation spend less time in interaction with their employees. However, the rule still applies that people with a higher level of emotional intelligence achieve better results in any position.

3 Data and methodology

The connection between the level of social skills and the position in the management hierarchy was subject to research also at our workplace. We hypothesised that the higher level of managerial position of a manager would also mean the higher level of social skills. We were evaluating 50 agricultural managers (25 men and 25 women) of 50 Slovak agricultural and food enterprises.

Table 1 **Numbers of surveyed companies in all self-governing regions of Slovak Republic**

Self-governing Region	No. of companies
Banská Bystrica Self-governing Region	3
Bratislava Self-governing Region	2
Košice Self-governing Region	3
Nitra Self-governing Region	15
Prešov Self-governing Region	3
Trenčín Self-governing Region	8
Trnava Self-governing Region	6
Žilina Self-governing Region	10
Together:	50

Source: Own results.

Riggio's Social Skills Inventory (SSI) was used to measure the level of social skills. This test was developed as a significant method in the area of communication and social interactions. It is also used for measuring emotional and social intelligence. It has been increasingly used in the area of manager assessment, consultancy activities, but also in training and development programmes.

The SSI measures three manifestations of social skills – sending, receiving, and controlling information at two levels – non-verbal (emotional) and verbal (social). According to Riggio & Carney (2007), successful managers generally score high points in the SSI.

The examined managers were classified by the values they scored and according to the recommended criteria into three categories – groups with low, middle, and high level of social skills. On the basis of these criteria, 13 managers achieved the first, 22 managers the second and 15 managers the third level.

Table 2 **Numbers of managers in companies by level of social skills**

Level of social skills	No. of managers
1st level of soc. skills	13
2nd level of soc. skills	22
3rd level of soc. Skills	15
Σ	50

Source: Own results.

Graph 1 **Graphical representation of managers in companies by level of social skills**
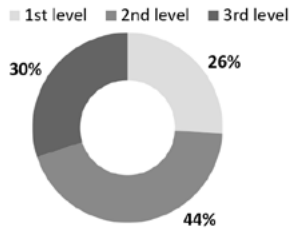
Source: Own results.

Managers were also divided into three groups based on their position in management hierarchy. We distinguished among first-line managers, middle managers and top managers. In our sample, we identified 15 managers at the level of first-line management the, 19 managers at the level of middle management and 16 top managers.

Table 3 **Numbers of managers in companies by degree of management positions**

Degree of management positions	No. of managers
1st level of man. Positions	15
2nd level of man. Positions	19
3rd level of man. Positions	16
Σ	50

Source: Own results.

We tested the validity of our hypothesis using the $\chi 2$ test and the contingency coefficient. We were observing two variables - A and B. A represented the level of social skills and B the level of managerial position. Individual levels of social skills and managerial positions of managers were put into a contingency table.

Table 4 **PivotTable**

Level of management positions Level of social skills	1st level of man. positions	2nd level of man. positions	3rd level of man. positions	Σ
1st level of soc. skills	6	9	5	20

Level of management positions Level of social skills	1st level of man. positions	2nd level of man. positions	3rd level of man. positions	Σ
2nd level of soc. skills	1	4	1	6
3rd level of soc. skills	8	6	10	24
Σ	**15**	**19**	**16**	**50**

Source: Own results.

In order to be able to test our hypothesis, we first tested the H0 hypothesis for independence of the observed variables A and B using the χ2 – test at a selected significance level α = 0.05.

We used the null hypothesis to verify the following statement:

H0: We assume that the level of social and communication skills in managers does not affect the level of managerial position.

The calculation of χ2 statistics was carried out using the STATISTICA program. We calculated the value of the χ2 test statistic and p-value, i.e. the probability of making a mistake by rejecting the test null hypothesis. The computer output gave us the value of the χ2 test statistic, the degree of freedom (df) of the test statistic and p-value: Pearson Chi-square: 31.8301, df=4, p=0.000002.

As the calculated value of probability was lower than the selected significance level, we rejected the null hypothesis. This means that the correlation between the observed variables was statistically significant. The test has proved that social skills of examined agricultural managers statistically significantly affect the level of managerial position.

The intensity of statistical dependence of the observed variables A and B was assessed using the contingency coefficient. We calculated the degree of dependence between the levels of social skills and the levels of managerial position. The contingency coefficient value was: r A, B = 0,97.

4   Conclusion

The value shows the high level of direct correlation between the level of social skills and the level of managerial position in selected agricultural managers.
Our research results suggest that the more complex the work of managers, the greater the role of social skills in the overall success. Based on our findings, we recommend the following activities for improving the managerial work:

- extending knowledge from other areas important for managerial work such as psychology or sociology,

- dealing with the issue of social skills through various forms of lifelong learning,
- increasing the level of one's own social skills through training and development programmes.

Acknowledgements

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WHAT IS LACKING IN THE ENTREPRENEURSHIP EDUCATION IN SLOVAKIA?

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Abstract

Entrepreneurship education in Slovakia was affected by the situation before 1989 as well as entire entrepreneurial environment. The opportunity to start own business grows faster after Velvet Revolution, but entrepreneurial spirit was born slowly. People accustomed to obey employer's orders hardly get rid of old habits. However, new and new generations of potential entrepreneurs are coming to the labour market and they affect it by their business sense and entrepreneurial knowledge acquired by education. Schools have an impact on the business environment through education. But, the question is whether or not they educate future entrepreneurs properly. Paper based on the opinions of successful entrepreneurs which in the process of in depth interviews expressed their opinions on entrepreneurship education in Slovakia. They reviewed their own experiences and suggested several proposals and recommendations for improving process of education of potential entrepreneurs.

Keywords: *entrepreneurship, education, methods, business, entrepreneur, interview, Slovakia*

JEL classification: *A29, I23, I29*

1   Introduction

Entrepreneurship in Slovakia has shorter tradition compared with states of Western Europe. Political changes after 1989 allowed the start of independent business units. Strong social changes have been manifested in life of citizens very slowly.

Suddenly they could start own business but often did not know how. Before 1989 schools did not focus on entrepreneurship education. They did not have any reason. In the planning economy all economically active inhabitants were employees and they did not need any business related skills. Even the ones on the managerial positions used just fraction of actually needed business skills. For example strategic planning, competitive fight, procurement of financial resources or the ability to orientate in the international business environment was not substantial, important and required. After 1989 started successful period for naturally enterprising individuals who were quickly oriented in new situation and start own business. However, the majority of inhabitants were lost in new environment and some of them, mainly the older ones never really adopt it. Education system represented by bureaucratic institutions adapted also very slowly. Putting into practice new, entrepreneurial oriented study programs was slow and did not meet market requirements properly. New skills and abilities becomes important not just for raising number of entrepreneurs but for employees in new, market oriented companies as well. Economically and managerial oriented study programs becomes very popular and fundamentals of business becomes standard part of the non-economics study programs as well. Starting own business after graduation becomes one of the highly valued carrier opportunities too. But, are graduates prepared for this career properly?

In 2015, Slovakia outperforms most other EU members in terms of the percentage of adults involved in starting a new business (9.6%). In addition, there has been a recent increase in those businesses started out of opportunity (68.4%) while almost a quarter of adults perceive good opportunities to start a business (GEM, 2016). However, Slovakia's entrepreneurship ecosystem still faces a number of challenges. According to Pilková et al., 2016 this includes inadequate transfer of research and development (R&D) and a lack of entrepreneurship skills development in the education system. Surprisingly there are 43 % study programs with at least one subject directly aimed with the entrepreneurship in Slovak higher education system. And just 6 % of analysed study programs do not include subject at least indirectly aimed at entrepreneurship (Plevný et al., 2016). The effectiveness of this study and the applicability of graduates are becoming one of the most actual topics in Slovak education environment.

2   Data and Methods

Paper represents the friction of Slovak part of international research project "Innovative entrepreneurship education - necessary precondition for future prosperity of V4 region "supported by the Visegrad Fund. Examined part of research

focused on in depth interviews with successful entrepreneurs who expressed their opinions on entrepreneurship education in Slovakia. They evaluated their own experiences with entrepreneurship education, review their acquired knowledges and abilities and propose some recommendations and improvements. Interviews were realized on the sample of ten successful Slovak entrepreneurs (two women and eight man), of average age 39.7 years, 9 years of business experience and nine employees. Five of them are graduates of universities. Six of them are doing business in the field, which they studied and a half of them are doing foreign-trade activities in their practice. As regards to the sectors: five entrepreneurs are devoted to trade, four of them to the production (two trade and production at the same time), seven of them are providing the service.

Research design and methodology was fully set by international team of experts involved in mentioned research project (Figure 1). For our purposes, we consider such successful entrepreneurs who employs at least one employee, and runs his/hers company more than two years. Graduating from higher education, the length of business experience, age or the profitability of the business activities carried out in our case for inclusion in the category of "a successful entrepreneur" were not relevant.

Figure 1 **Research design**
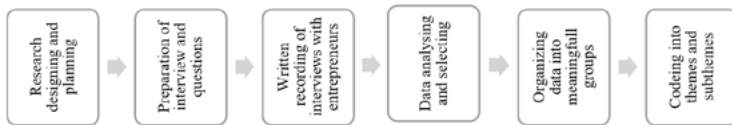
Source: Own processing.

The questioners were only experienced inquirers, which have used this research method earlier. The environment for the interview was selected upon agreement with each respondent. The length of the interview was approximately 60 minutes, questions were open without a suggested choices. Altogether thirteen research questions was set. Thematically they were selected into five themes:

A. External conditions (environment) for starting business:
  1. What is the most important factor that (could) supports entrepreneurship in the country?
  2. What factors limits entrepreneurship and prevent it?

B. Entrepreneurship and educational system (university education)
  1. Did you start your business in the area, you studied?
  2. What knowledge/ability did you use in the first years of entrepreneurship?

C. Recommendations for entrepreneurial education at universities
1. What would you want to learn if you had the chance to go back to the university?
2. Does/did/should education help entrepreneurs with the "core idea" or just with supporting tasks or with motivation for entrepreneurship?
3. What do you think universities do incorrectly during entrepreneurial education?
4. What could be done better? / What do you think universities should do?

D. Teaching methods
1. Would it be helpful to meet entrepreneurs during "formal education" (best practices)?
2. Do you think shadowing programs are helpful?
3. Can you think about other teaching/educational methods, which are suitable for entrepreneurial education?
4. Do you think that companies should support entrepreneurial education?

E. Experience from being an entrepreneur
1. You have definitely experience some problems/failures? Could some of them be avoided within the (university, formal) education process? If yes, how?

Answers were transformed into written records and analyzed later on. In post interviewed phase, the data selecting and analyzing was set. Data were organized into meaningful groups and was coded into themes and subthemes. In this process we identified four main research problems: 1. factors which can help to improve business environment for entrepreneurship, 2. factors possibly supporting students during starting own business, 3. weaknesses in the educational process at universities, 4. recommendations for university education.

3 Results and Discussion

Examining the effectiveness of education in any area can not be realized without analysing its supporting environment. Business environment in Slovakia is known by several limitations. Interviewed entrepreneurs considered them as more important than the factors that encourage and support entrepreneurship in the country. Surprisingly they did not agree on the single factor which support entrepreneurship in Slovakia generally, or at individual level. Four entrepreneurs mention weak enforceability of law, five of them mention problematic system of

employment new people and six of them mentioned low transparency of the markets.

As more important limitations were identified problematic and very difficult administrative process of starting business (8 answers) and administrative hurdles in the whole entrepreneurship (9 answers) as well. All of them agree, that the most important limitation factor for Slovak entrepreneur is generally too unarranged legislation. After analysing their answers, we identify six factors, which can help to improve quality of business environment in Slovakia (Figure 2).

Important is, that nobody consider weak education system or unavailability of education in the field of entrepreneurship as one of these limitations. On the other hand, mentioned unarranged legislation and non transparent business environment means difficulties in the entrepreneurship education. Universities are therefore forced with high demands on quality of provided information. Secondary, also higher demand of practical exercises and other acquiring of practical skills should be involved in educational process.

Figure 2 **Factors which can help to improve business environment for entrepreneurship**
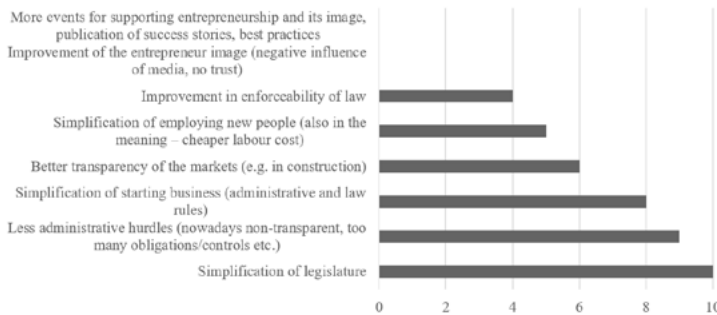
Source: Own research, 2016.

The second part of research focus on knowledge and abilities learned at school or university which they use in the first years of their entrepreneurship. Entrepreneurs expanded their answers and except their personal experiences. They also included opinions on what factors could possibly support graduates in starting own business now. Even though examined entrepreneurs agree, that there is not big difference in this factors now and in time they started.

Figure 3 **Factors possibly supporting students during starting own business**
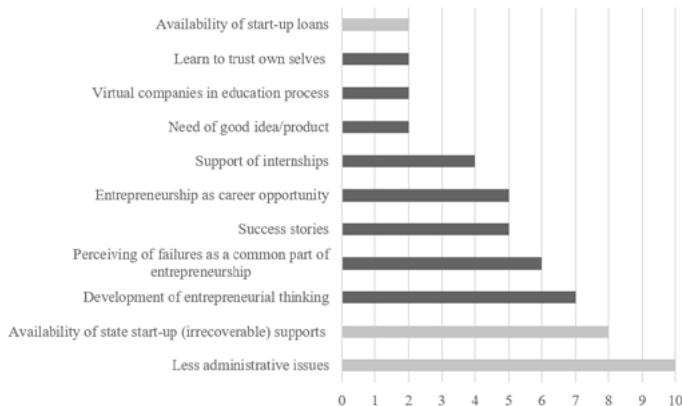
Source: Own research, 2016.

Entrepreneurs identify various factors which helped them or which could help to graduates with the starting own business. We assume, that three (including top two) of them can not be directly affected by education (Figure 3): availability of start-up loans, availability of state start-up irrecoverable supports and simplification of administrative issues. To be honest, we have to admit, that thorough knowledge of administrative issues and start up financing would be one of the priorities in entrepreneurship education in Slovakia. Other mentioned factors which can support entrepreneurs can be directly affected by education. This factors can be linked together into subtheme "Building of managerial spirit". Entrepreneurs agree that for success in business the one have to trust own selves and the career of entrepreneurs as well. Schools should educate them that entrepreneurship is as equally interesting opportunity as other job opportunities, that initial failure is not obstacle to future success and that good business idea is crutial. This process should be strongly supported by internships, success stories and learning on virtual companies.

Figure 4 **Weaknesses in the educational process at universities**
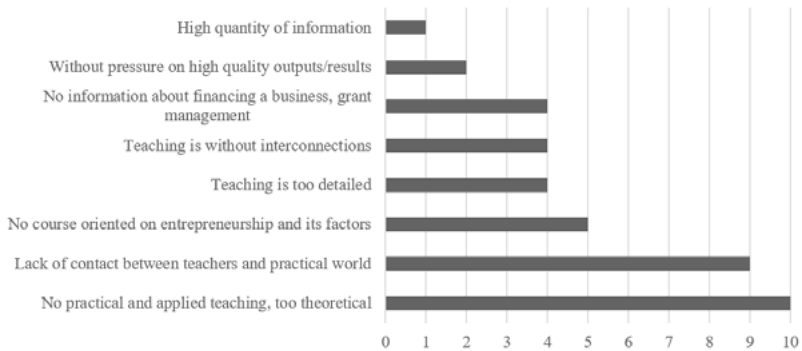
Source: Own research, 2016.

Consequently, next part of the interviews focused on entrepreneurs recommendations for entrepreneurial education (not only at universities). Important were their opinions on what would they want to learn in if they had the chance to go back school. Last but not least we wanted to know what they think universities do incorrectly and what could be done better. Surprisingly, all of them assume that there is no practical and applied teaching of entrepreneurship and that this teaching is too theoretical and quantity of information is too high. Nine of them think that the reason is, that teachers do not have own practical experiences and connection with business world (Figure 4).

Subsequently, they suggest several recommendations for entrepreneurship education (Figure 5). From one to tree answers has topics which we assumed are commonly separate subjects in entrepreneurial oriented study programs or at least they are a part of them. It was Business plan, which is usually part of Corporate planning or Basics of Entrepreneurship as well as support of starting up company and learn to understand the world (in the meaning of business world). Subsequently, there were typical managerial basic themes as Communication, Planning and Project learning which are taking part of most of managerial oriented subjects. The same it was with Marketing and teaching how to find market opportunities which are commonly teaching at fundamentals of marketing and almost every marketing oriented subjects. Four and five answers has not special subjects or themes but we can commonly name them "methods how to teach future entrepreneurs". Experts assumed that entrepreneurs has to be (in preparation for real business) stressed on the results of their work, teached to interconnect learned information from several aspects and they should take a part it some internships (also international internships). As the most important

recommendation for education successful entrepreneurs highlighted teaching of financial aspects of entrepreneurship (9 answers).

In the end entrepreneurs were asked to evaluate some suggested teaching methods or add some own recommendations for entrepreneurial education. It was difficult to make a summary of their suggestions so we are including some specific individual opinions. Seven out of ten entrepreneurs think that showing best practices: "would be motivating" for students and two of them think, that: "useful would be also to show them some un-successful ones and their stories". One of them add interesting experience which could also affect current students: „I passed it in the school, but at that time I took it as a necessary evil. Now it would be motivating for me."

Figure 5 **Recommendations for university education**
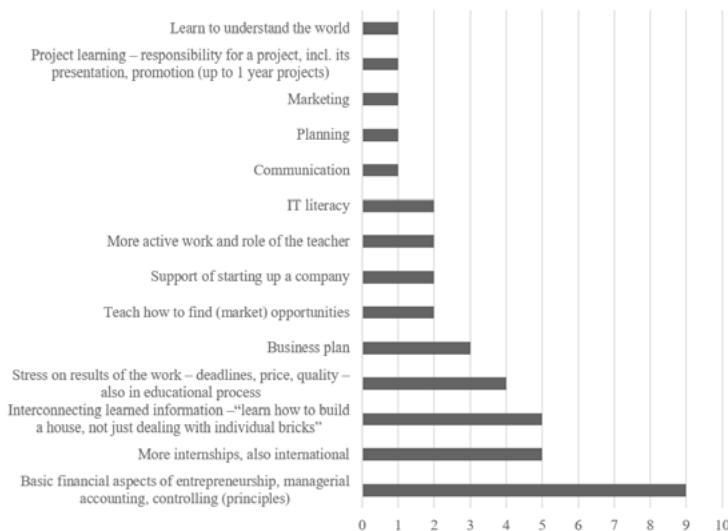
Source: Own research, 2016.

Less unambiguous was their opinion on shadowing programs. All examined entrepreneurs who were graduates of vocational schools told that: „I passed it during the school practice and it inspired me" but „You should choose the right students which are interesting in this type of education, it is not for all of them". On the other hand, they commonly surprised us by statement as: "I am sure that it would be helpful for students, but now as an entrepreneur I would never cooperate on program like this (do not want to be watched and nanny them)." From other types of special methods they stated already mentioned internships

(the school of life), case studies and special seminars with experts. Last but not least we asked them to comment on the cooperation of schools / universities with practice, respectively if they think that companies should support entrepreneurial education at universities. One half of asked entrepreneurs think that cooperation with educational institutions is a part of corporate social responsibility approach of company and say: „Yes, they should cooperate, students are our future. "Even additional two states that: „Yes, they must, for some of them is progress and cooperation with young people crutial (IT technologies, marketing, design and other creative companies). "On the other hand another tree have the opposite view and told: „No, student breaks system, needs mentor, bring problems. "We assumed this opposite opinion as a little bit selfish and it can be concluded, that social responsible companies attach an importance to cooperation of educational institutions and business units (cooperation between theory and practice) and would be helpful in it. Last but not least the depth of teaching of selected subjects was examined. In different ways entrepreneurs mentioned that teacher should not give strong directions, but just showing the ways: „Students have to know the system, limits, rules and framework. They do not need deep information of each area. "This style of teaching should raise competent and strong individuals who can deal with all kind of new unexperienced problems.

4 Conclusion

Entrepreneurship education is one of the most important factor of reaching prosperous socio-economic environment of country. In Slovakia situation of this area dramatically changed after Velvet Revolution and nowadays entrepreneurship slowly becoming equal career opportunity to other valued professions. Consequently, entrepreneurial oriented study programs at high education becomes very popular and every year they „produce" thousands of absolvents. However, the problem of their applicability in the labor market strongly resonant in society. Paper deals with this problem from the point of view of ten successful entrepreneurs who in the form of in depth interviews evaluated their experiences and opinions on the problem of entrepreneurial education in Slovakia. These experts assume Slovak business environment as unarranged, too buerocratic and complicated. In connection with this education should help to future entrepreneurs to know the system and encourage them to choose a career in this environment. Unfortunately, instead of this students usually meet directive and theoretical oriented teachers who have not appropriate experiences or connection with real business in practice. Therefore successful entrepreneurs recommends teaching with the focus on the practice and giving advices instead of strict directions. They also assumed

that students in their educational process should: meet real (same age, successful / un-successful) entrepreneurs, acquire better overview and get rid of their illusions. They should realize, that they will really need information and knowledge they receive at university. Universities / schools should provide theoretical framework for future business career and some practical experiences. At this point, cooperation between educational institutions and entrepreneurs is crutial. Even though for entrepreneurs this relation with students can be onerous, it could be a form of their social responsibility. Also schools should change their approach and start to threat students as a strong individuals and educate future successful entrepreneurs.

Acknowledgements

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ENTREPRENEURIAL INTENTIONS OF STUDENTS: A CASE OF SLOVAKIA

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Abstract

Despite the attention being paid to entrepreneurial intentions in the literature, little empirical research has been conducted on developing the link between personal characteristics, education and exposure to entrepreneurship in transition economies. Moreover, only a few empirical studies have investigated this issue in Slovakia. The conducted empirical study based on a survey examines entrepreneurial intentions of students in Slovakia. The empirical findings are based on 235 responses from students. To evaluate the entrepreneurial intentions, the questionnaire of own construction drawing heavily from already used questionnaires was used. The authors have used Kruskal-Wallis test as an evaluation method. Based on the results it can be concluded the entrepreneurial intentions are determined by gender and family background. Higher levels of entrepreneurial intentions are confirmed among males and among students from entrepreneur families. This study contributes to the European research that studies the entrepreneurial intentions by means of an empirical investigation in a transition economy such as Slovakia.

Key words: *entrepreneurial intentions, personal characteristics, education, exposure*

JEL classification: *M13, M21*

1   Introduction

Last three decades in the Central and Eastern European countries (CEEC) are characterized by many changes in economic, social, cultural, and other areas. After regime change at the end of 1980s, many CEEC pass through the transformation process from centrally planned into market-oriented economies. Entrepreneurship is seen as a critical factor in promoting innovation, creating employment

opportunities and generating social and economic wealth in a country's economy (Wong et al., 2005). Higher opportunity to be self-employed decreased demand for entrepreneurship education. This growth has been based on the implicit premise that entrepreneurship education can contribute to the development of students' entrepreneurial attitudes, abilities, and skills, and hence enhance their intentions to launch new ventures (Piperopoulos and Dimov, 2015).

Entrepreneurship education should definitively be one of the biggest entrepreneurship intention drivers. By entrepreneurship education, we are referring to education for entrepreneurial attitudes and skills. Entrepreneurial intentions are desires to own or start a business (Bae et al., 2014). Entrepreneurship education consists of any pedagogical program or process of education for entrepreneurial attitudes and skills (Fayolle et al., 2006).

This paper extends the existing research on entrepreneurial intentions by examining the impact of selected factors (age, gender, education level, form of study, work experience and family background) on entrepreneurial intentions. It specifically deals with moderating influence of personal characteristics, education and exposure on the entrepreneurial intentions of students in Slovakia. Our paper therefore contributes to the developing body of knowledge on factors determining students' intentions to choose an entrepreneurial path.

The rest of the paper is structured as follows: Section 2 reviews the empirical literature on entrepreneurial intentions. Section 3 presents the data and the methodology. In section 4, empirical results are summarized and implications are discussed. Section 5 concludes.

2   Literature Review

Entrepreneurship education is associated with entrepreneurial self-efficacy, which may increase entrepreneurial intentions (Zhao et al., 2005; Wilson et al., 2007). After the Shapero´s publications (Shapero, 1984; Shapero and Sokol, 1982) literature oriented to entrepreneurial intentions started to growth. There are some other publications that helped to develop intentions approach (Gartner, 1985; Shaver and Scott, 1991). With respect to entrepreneurial intentions educational background is an important factor (Guerrero et al., 2008). Entrepreneurship courses orientation, was examined by Piperopoulos and Dimov (2015). They argue that higher self-efficacy can be associated with lower entrepreneurial intentions in the theoretically oriented courses and higher entrepreneurial intentions in the practically oriented courses. An entrepreneurship education may cultivate a student's attitudes and intentions, as well as the founding of a new firm (Liñán, 2008). Martin et al. (2013) found a statistically significant relationship between entrepreneurship education

and human capital outcomes, such as entrepreneurship-related knowledge and skills a positive perception of entrepreneurship, and intentions. Jamieson (1984) proposed a three-category framework for entrepreneurship education: education about enterprise; education for enterprise; and education in enterprise. Kolvereid and Moen (1997) study of Norwegian business schools show that graduates with an entrepreneurship major are more likely to start a new venture and have significantly stronger entrepreneurial intentions and aspirations than other graduates. At the same time, study of an entrepreneurship course in Netherlands suggests an insignificant effect on students' entrepreneurial skills and even a negative effect on their entrepreneurial intentions to launch a new venture (Oosterbeek et al., 2010)

In the literature on individual-level determinants of entrepreneurship it is argued that individuals who are, for instance, more achievement oriented (Collins et al., 2004), more risk tolerant (Stewart Jr. and Roth, 2001), more independence seeking (Douglas and Shepherd, 2002), more self-efficacious (Chen et al., 1998), more creative (Lee and Wong, 2004), more susceptible to decision-making biases (Simon et al., 1999) are more likely to launch their own business. Bae et al. (2014) showed some interesting findings in the research where gender, entrepreneurial family background, and cultural values are testing as an important factors of entrepreneurship intensions. They found non-significant effects for two individual differences: gender and entrepreneurial family background. In contrast, cultural dimensions played a significantly positive role in the entrepreneurship education –entrepreneurial intentions relationship. However, family members often play a crucial role in providing financial and human resources for business start-up (Zhang et al., 2003).

Family influences are crucial for the development of young people's occupational intentions (Jodl et al., 2001). Several scientists argue that exposure to a family business can predispose offspring's entrepreneurial intentions by increasing their perceptions that self-employment is a feasible career option (Laspita et al., 2012). Some authors suggest that the existence of family member with entrepreneurial experiences increases entrepreneurial ambitions because such individuals can serve as role models (Pruett et al., 2009). Davidsson and Honig (2003) found that there was a positive relation between having parents and/or close friends in business and the encouragement and support from the family. Klyver (2007) found that family members are most strongly involved in the early stages of the lifecycle when the decision to start or not is yet to be made. Key persons can be grandparents also. Grandparents' narratives about their former businesses may provide their grandchildren with knowledge about entrepreneurship and lead to the development of entrepreneurial self-efficacy. They may directly provide their grandchildren with financial and non-financial resources needed to start a business. Entrepreneurial grandparents may provide their grandchildren with

the same or similar information and knowledge about entrepreneurship and its benefits as compared to other occupational careers (Laspita et al., 2012).

Other important factor examined by the scientists is connected with personality. The role of personal factors in the development of an entrepreneurial career has been widely investigated (Zacher et al., 2012; Altinay et al., 2012). The influence of personality traits is the highest determinant in business start-up intentions in budding entrepreneurs (Nga and Shamuganathan, 2010). Another intention connected with entrepreneurship is associated with current state of the country (GDP, unemployment, poverty, living conditions). Given the economic and social relevance of entrepreneurs, it is important to understand what drives young people's intent to start a business, especially those from developing countries (Tolentino et al, 2014). Social capital, as an indication of the characteristics of the social network, is also a major background factor affecting intention (Liñán and Santos, 2007). The strength of the entrepreneurial intentions varies across cultures (Carsrud et al., 2011). Culture is a major determinant explaining why some societies are more entrepreneurial than others (Stephan and Uhlaner, 2010). Only few empirical studies have explored the role of organizational drivers for entrepreneurial intentions. Specifically, Lee et al. (2011) studied entrepreneurial intentions in a corporate setting. Organizational culture, acting through institutional belief systems and norms, can be a very effective means of directing the attitude and behavior of organizational members towards entrepreneurial activities (Huyghe and Knockaert, 2015).

Two dominant models of entrepreneurial intention include Shapero's (1975) Entrepreneurial Event Model and Ajzen's (1991) Theory of Planned Behaviour. In the first model, entrepreneurial intention reflects the perceived desirability and feasibility of becoming an entrepreneur. In the second model, entrepreneurial intention is determined by one's personal attitude toward the behaviour, perceived social norms and perceived behavioural control.

The link between entrepreneurship education and entrepreneurial intentions is generally under researched. In his social cognitive theory, Bandura (1977) mentions that one's expectations concerning self-efficacy are developed from four sources of information: performance accomplishments, vicarious experience, verbal persuasion and physiological states. Zhao, Seibert, and Hills (2005) argue that entrepreneurship education could provide all four or at least some of these sources. Women make up a substantial part of the university student population in Visegrad countries, ranging between 55 and 60% of total tertiary students (Eurostat 2015). Previous studies have shown, however, that women display lower entrepreneurial intentions than men (Santos et al., 2016). Therefore, the objective of the paper is to evaluate the impact of education, gender and exposure to entrepreneurship on entrepreneurship intensions of university students in Slovakia.

3 Data and Methods

A questionnaire of own construction (though drawing heavily from already used questionnaires (Carr and Sequeira, 2007; Chandler et al., 2009; Liñán and Chen, 2009; McGee et al., 2009; Vanevenhoven and Liguori, 2013) was used as a tool of data collection. The data collection was conducted from July 2015 to March 2016. The questionnaire was divided into several sections, each addressing different variable (Table 1). The content of the survey was developed with consideration of earlier research on entrepreneurship education. The study employs measures which on the one hand reflect entrepreneurial intentions of students and on the other tries to assess factors which can affect these measures. We accounted for entrepreneurial exposure. In particular, we followed Vanevenhoven and Liguori (2013) by asking respondents to indicate whether their parents, siblings, or grand-parents had ever started a new venture, and simplifying slightly another question whether they ever worked for a new venture/startup. Additionally, we accounted for their employment experience and self-employment experience. We used also a number of control variables addressing questions of respondents' gender, age, field of education, level (bachelor, engineering, master, postgraduate) and mode of studies (regular, weekend) which they attend (Table 1).

Table 1 **Variables, coding and measurements**

Variable	Variable code	Measurement
Age	I_1	continuous variable
Gender	I_2	0=male; 1=female
Education level	I_3A	1=bachelor; 2=engineer; 3=master; 4=PhD./postgraduate
Study form	I_3B	0=daily (present form); 1=weekend (external form)
Study focus	I_3C	1=business (economics and management); 2=technical; 3=natural/life; 4=other
Work experience	I_4	0=no; 1=yes
Exposure	I_5 to I_7	0=no; 1=yes
Carrier plans	I_15A to I_15H	1-5 scale: 1=strongly disagree; 3=neutral; 5=strongly agree

Source: Own processing.

The data was collected in the Slovak Republic. In order to obtain a more represent-ative view of the role of entrepreneurship education a survey targeting university

students was administered. The questionnaire was distributed in the combined manner, both in printed and digital form. Four Slovak universities were involved (Slovak university of Agriculture, University of Constantine the Philosopher, Comenius University and University of Ss. Cyril and Methodius). It was directed mostly, though not exclusively towards students of the final semesters, either of bachelor or master studies. Smaller part of participants, however, was less advanced in their education. It was also intended to cover a sample of both business and non-business students and to obtain responses from both bachelor and master students.

Since the assumption of the normality was violated (Kolmogorov-Smirnov test, p value 0,023), non-parametric statistical methods were used. To verify the existence of statistically significant differences between the individual groups of respondents (depending on a particular factor, see classification units, table 1) the Mann-Whitney U test and Kruskall-Wallis test were used. Mann-Whitney U test is the non-parametric alternative test to the independent sample t-test. Kruskall-Wallis test is the non-parametric alternative to ANOVA.

The main objective of the research is to assess the influence of selected factors on the respondents` decision regarding their future carrier immediately after graduation and 5 years after graduation. We evaluated the influence of selected personal characteristics (age, gender), education (study grade, study focus) and previous exposure to entrepreneurship (job experience, family background). The research design is as follows (Figure 1):

Figure 1 **Research model**
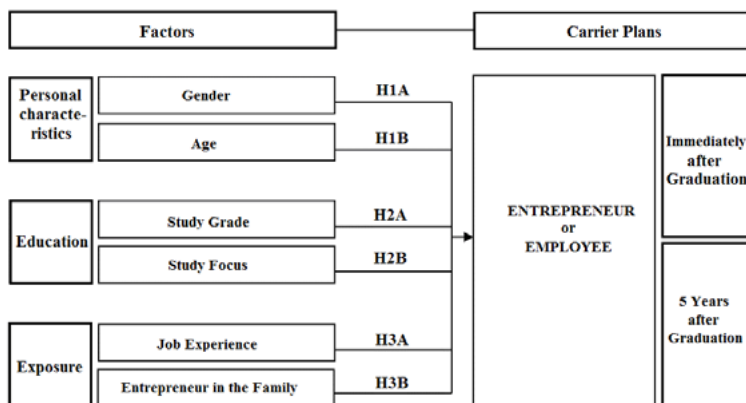
Source: Own processing.

Based on the literature review weset 3 hypotheses,each of them connected to different factor (driver):

H1: Respondent`s intentions towards becoming entrepreneur are determined by his/her personal characteristics.

H1A: Respondent`s intentions towards becoming entrepreneur are determined by his/her gender.

H1B: Respondent`s intentions towards becoming entrepreneur are determined by his/her age.

H2: Respondent`s intentions towards becoming entrepreneur are determined by his/her education.

H2A: Respondent`s intentions towards becoming entrepreneur are determined by his/her study grade.

H2B: Respondent`s intentions towards becoming entrepreneur are determined by his/her study focus.

H3: Respondent`s intentions towards becoming entrepreneur are determined by his/her earlier experience with entrepreneurship.

H3A: Respondent`s intentions towards becoming entrepreneur are determined by his/her job experience.

H3B: Respondent`s intentions towards becoming entrepreneur are determined by his/her exposure to the entrepreneurship in the family circle.

4   Results and Discussion

The reliability of the questionnaire was verified using Cronbach`s Alpha method. The Cronbach`s Alpha of all questionnaire sections (apart from the carrier plans sections) was higher than 0.7, therefore we conclude the questionnaire`s reliability is sufficient. The overall results can be seen in table 2.

Table 2 **Reliability of the questionnaire evaluation**

	Cronbach`s Alpha
Study description	0.711
Carrier plans	0.502
Causation	0.831
Effectuation	0.750
Intentions	0.943
Skills and competences	0.938

Source: Own processing.

Out of the total number of 235 respondents, there were 136 women and 99 men. The majority of students is studying at the bachelor level (68%) at daily form (70%).

The prevailing education focus was economics and management (64%). There were 28% of respondents whose family member is an entrepreneur (Table 3).

Table 3 **Description of survey sample**

		Structure of respondents: Number	Structure of respondents: %
Gender	women	136	57.87
	men	99	42.13
Education level	bachelor	160	68.09
	master	75	31.91
Form of study	full time form	166	70.64
	distance form	69	29.36
Education focus	economics and management	150	63.83
	technical sciences	85	35.74
Entrepreneur in the family	no	170	72.34
	yes	65	27.66

Source: Own processing.

Based on the achieved average scores we conclude men are more inclined to become an entrepreneur both immediately after the graduation and 5 years after the graduation. The differences based on the education level are almost non-existent, the entrepreneurial intention of students studying at the bachelor and master levels are very similar. The attitude of students of the distance form of study towards becoming an entrepreneur is more positive when compared to the attitude of the students of the full time form. The entrepreneurial intentions of students of technical sciences are similar to the intentions of students of economics and management. The most obvious difference in entrepreneurial intentions is based on the fact, whether the students are hailing from a family of entrepreneurs (Table 4).

Table 4 **Entrepreneurial intentions – Average scores**

		immediately after graduation	5 years after graduation
Gender	women	2.54	3.30
	men	2.84	3.71
Education level	bachelor	2.64	3.49
	master	2.72	3.44

		immediately after graduation	5 years after graduation
Form of study	Full time form	2.36	3.19
	distance form	2.80	3.59
Education focus	economics and management	2.61	3.52
	technical sciences	2.79	3.40
Entrepreneur in the family	no	2.53	2.82
	yes	3.61	3.88

Source: Own processing.

With respect to structure of data and the results of tests of normality, we used Mann-Whitney and Kruskal-Wallis tests for evaluation of existence of statistically significant differences in attitudes of respondents (Table 5). However, the results should be approached with cation, since both these tests are not that robust as their parametric alternatives (they do use the variables` ranks instead of their values).

The results confirmed the existence of statistically significant differences in entrepreneurial intentions of respondents based on their gender 5 years after the graduation (H1A was confirmed). Another statistically significant difference in entrepreneurial intentions was confirmed in attitudes of students with and without entrepreneurial family background (H3B was confirmed). There were no other statistically significant differences, the rest of the hypotheses (HB, H2A, H2B and H3A) was not confirmed.

Table 5 **Entrepreneurial intentions - Results of tests**

		immediately after graduation	5 years after graduation
H1: personal characteristics	H1A: gender	0.083	0.027**
	H1B: age	0.521	0.400
H2: education	H2A: study grade	0.554	0.917
	H2B: study focus	0.213	0.488
H3: experience with entrepreneurship	H3A: work experience	0.734	0.866
	H3B: entrepreneur in the family	0.002***	0.006***

Note: ***,**,* denote statistical significance at the 1%, 5%, 10% levels respectively
Source: Own processing.

Gender differences in entrepreneurial intentions are very frequent single research topic. Our results suggest, the males exhibit a more positive attitude towards entrepreneurship and a higher entrepreneurial intentions. Strobl et al., (2012) came to a similar conclusion, as well as Dabic et al., (2012); Kautonen et al., (2010) and Yordanova, (2011). Nevertheless, these results need further explanation. The association of entrepreneurship with a male gender stereotype seems to explain part of this difference (Gupta et al., 2008, 2009).

Our findings regarding the family background are in line with those of Carr and Sequeira (2007); Bhandari, (2012); Hadjimanolis and Poutziouris, (2011), who tested the influence of prior family exposure to entrepreneurship (parents` occupation, the family business background). These studies concluded the family background to be an important factor moderating the entrepreneurial intentions.

5   Conclusion

Our study shows the importance of the family background in forming entrepreneurial intentions. Our analysis has revealed that a family background characterized by previous exposure to entrepreneurship (family members are entrepreneurs) has a positive impact on students' entrepreneurial intentions.

The results support the body of literature that finds systematically higher levels of entrepreneurial intentions, self-efficacy and social norms among males versus females across cultures. From a policy perspective, the study shows a need for the development of policy instruments that may support female entrepreneurship. Assisting women to start and grow enterprises would reduce unemployment, contribute to economic growth in the country and create wealth. The findings of our study have implications for policymakers looking for measures to increase entrepreneurial intentions among women.

Acknowledgment

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PROPOSITIONAL CALCULUS IN TEACHING MATHEMATICAL SUBJECTS AND IN PRAXIS

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Abstract

In our paper we try to point out the most common logical mistakes in mathematical thinking made by students of the Slovak University of Agriculture in Nitra. The mistakes analysis was developed on the basis of students' tests. Students involved in the research were about to take their A-levels in Maths. Tasks in the tests were aimed at the use of an elementary logic – negations, general and existential quantifier in the curriculum of Mathematics at secondary schools and at universities. We tested our main hypothesis, that the involvement of mathematical knowledge into other parts of mathematics will improve a quality of students' knowledge. When formulating the main hypothesis of our research we relied on both, the theoretical knowledge of the issue and the experience based on our own teaching practice. Pedagogical experiment was carried out in two groups – the experimental and the control one.

Keywords: *propositional calculusmathematical thinking, elementary logic, statement*

JEL classification: *C02, C11, I210*

1   Introduction

A statement is an elementary term in both mathematics and logics. Learning to speak correctly means that one should know the basic ways of mathematical logic. Teaching mathematics does not mean only learning mathematical concepts but also developing mathematical thinking. We should point out the interrelationships between different concepts and means of mathematical logic.

Education for skills development must be based not only on efforts of teachers, but also on activities of students. We will focus on teaching mathematical logic and its importance in technical disciplines. Teaching mathematics, in general, contributes to the development of not only mathematical, but also logical thinking. Today, elementary mathematical knowledge and the insights into opportunities it brings are considered to be at least as important as the knowledge of the national history or the laws of physics. Different ways of thinking have come along with the development of mathematics. The issues of math education are still a priority; we talk about an increasing competence of both, students and modern math teachers. Quality requirements of a mathematical education are still very topical. Mathematical knowledge affects the level of development of other disciplines: computer science, electronics, electrical engineering, medicine, economics, etc. Teaching mathematics conveys a specific curriculum on one hand, on the other hand it develops logical thinking. In teaching mathematics it is necessary to apply logical procedures, which can be used in solving mathematical problems as well as applying them in practice. In mathematics, the tasks are very often solved by using mathematical logic that supports the development of the logical thinking at the same time. Országhová, Kozelová, Hornyák Gregáňová, Baraníková and Vollmannová state that "in the contemporary society the education gains new attributes; for university graduates the level of their knowledge and abilities is a very important factor for employment on the labour market" (p.657).

Ferenczi Vaňová, Hornyák Gregáňová, Váryová and Košovská (2014) say that "The essential condition for learning is the motivation that affects the results of learning in different situations. Motivation determines intrinsic activation of students resulting from their needs and is relevant to their claims. Motives present the intrinsic motives or incentives, activities designed to achieve a specific objective. They can be considered as the reasons for student's behaviour. For each individual there are many different motives that are interrelated and constitute a form of hierarchy."(p.202).

Propositional logic may be studied through a formal system in which formulas of a formal language may be interpreted to represent propositions. A system of inference rules and axioms allows certain formulas to be derived. These derived formulas are called theorems and may be interpreted to be true propositions (Matušek, 2015).

2   Data and Methods

Mathematical logic is a part of mathematics that occurs in all other parts of mathematics. A question of what should be a proportion of propositional logics in

mathematics compared with the other parts of mathematics arises. There is a discussion about how to teach students to understand terminology and its implications correctly, as only in the context of terms we can talk about mathematical sentences. The aim is for students to understand definitions and sentences properly, to be able to use them in their further studies or in solving mathematical or engineering problems. The aim is to choose such a method of teaching that will clearly show students different terms (concepts) so they will be able to combine them into sentences that are correct. This method should contribute to a more efficient learning of mathematical knowledge (Matušek, 2016).

To determine the level of students' knowledge of mathematical logic, we have decided to carry out a research, where the students of the Faculty of Engineering (FE) of the Slovak University of Agriculture (SUA) in Nitra participated. In order to increase mathematical competences of students, we have set these research objectives:

- to check the level of students' knowledge of selected mathematical topics focused on mathematical knowledge,
- to compare the level of knowledge in tasks with the focus on mathematical knowledge between two different groups of students in the subject Mathematics 1 taught at the FE SUA in Nitra,
- to analyse mistakes and procedural errors in handling individual tasks in tests.

When formulating the main hypothesis of the research we relied on both, the theoretical knowledge of the issue and the experience based on our own teaching practice.

Main hypothesis:

H: Involving mathematical knowledge into other parts of mathematics will improve a quality of students' knowledge.

Pedagogical experiment was carried out in two groups – the experimental and the control one. We were observing the changes that had occurred as a consequence of changed conditions in the experimental group (involving propositional logic into selected parts of mathematics) compared to the control one. The observation was used as an additional research method; its general objective was to identify some pedagogical phenomena and facts. When observing, we focused on a few selected activities: working alone and solving tasks in front of the class. Students were the object of the observation. The goal was to find out the amount of students' knowledge of mathematical logic and to determine their ability to use propositional logic in other fields of mathematics.

Location of the research: Nitra, SUA, Faculty of Engineering, 1ˢᵗ year
Research time: winter term 2016/2017

Contents of the target test: The test is composed of four tasks. For each correct answer a student gets one point, for each incorrect answer he does not get any points.

Students were given the following assignments

Example 1. Find out the truth value of the statement:
a) Every increasing function is invertible.
b) Every invertible function is increasing.
c) There is an invertible function that is increasing.
d) There is a decreasing function that is not invertible.
e) Not every invertible function is increasing or decreasing.
f) Every function is increasing or decreasing.

Example 2. Find out if the following statements are correct
a) Statement p : „Function f is increasing.

Negation of the statement p : „Function f is decreasing."
b) Statement q : „Function f is invertible."

Negation of the statement q' : „Function f is constant."
Examples 3 and 4 also show some of the students' answers:

Example 3. Martin's father said: "If Martin's GCSE results are outstanding, he will get a computer." Later on, when visiting Martin, we learnt that he has got a computer. According to this situation can we assume that his GCSE results were outstanding?

Solution. We will make a truth Table 1 with a conditional implication p q. The implication should be true, therefore the values "**1**" are shown in bold. Let's have a look at the first and third lines of the table (the lines with the true implication and the statement q - the assumptions are fulfilled) and we will find that the truth value of the statement p is 1 (first line) or 0 (third line). So even if Martin's GCSE results had not been outstanding, he would have got a computer. In fact, he could have got a computer as a reward for a different reason (e.g. a good behavior, help in the garden, etc.).

Conclusion. From this situation we cannot say whether Martin's GCSE results were outstanding.

Table 1 **The Truth Table for Example 1**

Statement p: "Martin's GCSE results were outstanding."	Statement q: „Martin has got a computer."	$p \square q$
1	1	**1**

Statement *p*: "Martin's GCSE results were outstanding."	Statement *q*: „Martin has got a computer."	*p*□*q*
1	0	0
0	1	**1**
0	0	**1**

Source: Author's calculations.

Example 4. Karol's father said, "If Karol's GCSE results are outstanding, he will get a computer." Later on, when visiting Karol we found out that his GCSE results are outstanding. According to this situation can we assume that he has got a computer?

Solution. Let's make the truth Table 2. The implication should be true, therefore the values **"1"** are shown in bold. Let us have a look at the first line of the table (the line with the true implication and the statement q - the assumptions are fulfilled) and we will find that the truth value of the statement q is 1 (the first line). So Karol has got a computer.

Table 2 **The Truth Table for Example 2**

Statement *p* „Karol's GCSE results were outstanding."	Statement *q*: „Martin has got a computer."	*p*□*q*
1	1	**1**
1	0	0
0	1	**1**
0	0	**1**

Source: Author's calculations.

Examples 1 and 2 show different ways of reasoning:
– in the Example 1 we cannot draw a conclusion
– in the Example 2 we can draw a clear conclusion

3   Results and Discussion

The results, we obtained in the research, were processed by different statistical methods. The analysis of the results is presented in the form of texts, graphs and tables. 74 students participated in our research. The main task of the research was to compare two research samples in the control and experimental groups.

The control group

The control group consisted of 35 students. The number of gained points in individual tasks, their percentage and the total number of points in the control group for each task is given in Table 3.

Table 3 **Gained points in the test (control group)**

Task No.	1	2	3	4	Total
100 % of points	66	26	17	17	126
Gained points	210	70	35	35	350
Success rate in %	31.4	37	49	49	36

Source: Author's calculations.

The above table shows that the lowest average success rate was achieved in the task No. 1 – Find out the truth value of the statement. The poor knowledge can be seen in the task No.2 – negations. The highest level of knowledge was found in the tasks No. 3 and No.4 - propositional calculus in praxis.

The experimental group

There were 39 students in the experimental group. Students of this group were working on tasks aimed at applying mathematical logic in solving problems.

The total number of points in the experimental group for each task is given in the table 4. This table also shows a sum of points for each task, the percentage of gained points for each task as well as the overall evaluation of the test.

Table 4 **Gained points in the test (experimental group)**

Task No.	1	2	3	4	Total
100% of points	141	49	28	30	248
Gained points	234	78	39	39	390
Success rate in %	60.3	62.8	72	76.9	63.6

Source: Author's calculations.

When we compare both groups, it is clear that in the experimental group the total success rate increased by 27.6 %. The table 4 shows that the lowest average success rate was reached in the task 1. The highest level of knowledge was recorded in the task number 3 and 4. Evaluation of success rate in individual tasks in both, the experimental and the control group is shown in the graph 1.

Graph 1 **Evaluation of success rate in individual tasks**
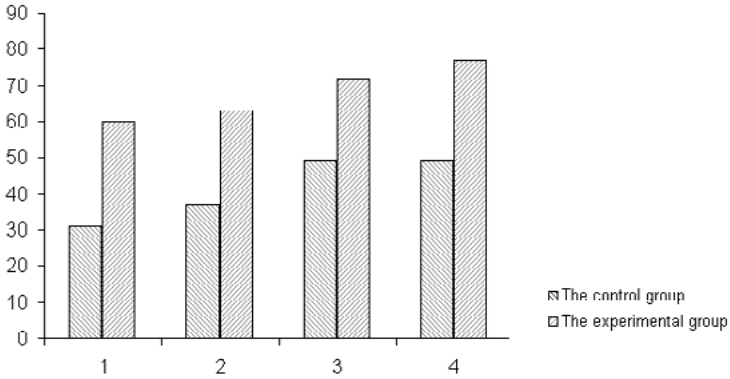
Source: Author's calculations.

Testing equality of variances

In statistics, an F-test for the null hypothesis, where two normal populations have the same variance, is sometimes used, although it needs to be used with caution as it can be sensitive to the assumption that the variables have this distribution. Let's assume that examples are realizations of random selections from the normal distribution $N(\mu_1, \sigma_1^2)$ a $N(\mu_2, \sigma_2^2)$ and we will test the hypothesis, which says that variances in both groups are equal, versus the hypothesis that the variances are different. (Table 5).

Test problem is: $H_0 : \sigma_1^2 = \sigma_2^2$ versus $H_0 : \sigma_1^2 \neq \sigma_2^2$

Table 5 *F*-**Test for Equality of Two Variances**

	The control group	The experimental group
Mean	3.6	6.358974
Variance	4.658824	2.183536
Observations	35	39
F	2.133614	
P(F<=f) one-tail	0.012233	
F Critical one-tail	1.735894	

Source: Author's calculations.

The F-test table brings $F = 2{,}133614$, the critical value where the level of significance is 0,025 and a test of significance is 1.735894 i.e., $F > Fkrit$ (1), and therefore the equality of variances is rejected.

Testing the level of students' knowledge in control and experimental groups

Because we have rejected the equality of variances, we are going to use the Two Sample Assuming Unequal Variances t-test in our testing. We will test the null hypothesis, which says that the level of students' knowledge is the same compared to the alternative hypothesis.

Our test problem: $H_0 : \mu_1 = \mu_2$ versus $H_1 : \mu_1 \neq \mu_2$

Table 6 shows that the statistical value of the t-test is - 6.34461. A critical value for statistical significance is 2.0000995. Since the absolute value of the t-test is bigger than Critical Values, then the hypothesis H_0 is rejected. We accept the hypothesis and claim that the average level of knowledge in these groups was significantly different.

Table 6 **t-Test: Two Sample Assuming Unequal Variances**

	Control group	Experimental group
Mean	3.6	6.358974
Variance	4.658824	2.183536
Observations	35	39
t Stat	-6.34461	
P(T<=t) one-tail	0.0000011172	
t Critical one-tail	1.671093	
P(T<=t) (2)	0.0000011344	
t krit (2)	2.000995	

Using statistical evaluation we have found out that the involvement of elementary logics into individual parts of mathematics brings better results. Students could not find ways to recognize the elements of a certain group to differ it from the other groups; they generalized terms in tasks being solved on the basis of inadequate or secondary characters. This was evident from false arguments that students reported as reasons for incorrect solutions. Mentioned errors can be eliminated by using negations in other areas of teaching mathematics (the theory of numbers, functions, sequences) and not only in teaching mathematical logic. The table 2 shows that students, who studied propositional logics, reached much better results in two parts of the task.

4   Conclusion

Logical reasoning should be a part of the Math curriculum as it promotes development of logical thinking, helps to eliminate various kinds of errors in solving problems in mathematical logic. Based on these findings, we can solve various problems of everyday life. Students do not understand the interconnection of concepts that are interrelated. Math teachers try to change their attitude to mathematics by introducing new methods:

– introduction of new terms by illustrative examples,
– detail specification of new terms,
– determination of interrelationships between terms by solving theoretical and practical problems,
– highlighting wrong techniques

The results of the t-test showed that by introducing propositional logic into the Math curriculum, the teaching process as well as the amount of students' knowledge can be significantly improved.

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THE ROLE OF FOREIGN LANGUAGES FOR CAREER GROWTH PERSPECTIVE OF UNIVERSITY GRADUATES IN THE NITRA REGION

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Abstract

The world of business is dramatically expanding, businesses compete in both domestic and foreign markets. Every day, more and more domestic companies move into international activities such as joint ventures, oversees investments, imports and exports, as well as expansions into foreign markets. Many companies are trying to compete in the field of international trade, even on the global level. The growth in the area of international marketplace can provide exciting career possibilities for university and college undergraduates. More and more opportunities are open for students in international carrers. The article reflects changes in the current workplace regarding many business companies within the country of Slovakia. It also attracts one's attention to changes regarding students´ familiarity with searching for attractive jobs on the one hand, but on the other hand it is related to changes in companies´ familiarity with searching for potential candidates, especially university graduates mastering one or more foreign languages. Bilingualism and multilingualism offer a competitive advantage to both companies operating in the domestic and international business markets as well as to university graduates who pursue their career in them.

Keywords: *foreign languages, career development, workplace, university graduates*

JEL classification: *I00, I23, F15*

1 Introduction

University graduates often want to work in big international companies, prestigious firms with good a reputation and image, if it is possible. Diploma holders – when looking for jobs - are usually more advantageous over other applicants. Thanks to their completed studies, they can choose from a wider range of job alternatives.

They are more attracted by the opportunity of exciting work with a certain career growth perspective. They are looking for jobs offering higher pay scales and more advantageous benefits. They are excited about learning new things, working with modern technologies, they are also eager to learn about new cultures. Many university graduates are attracted to international companies because of business travel opportunities. Travelling and exploring new cultures can be a kind of excitig prospect.

On the other hand, there are employers looking for more narrowly specialized experts, but they often have to fight with a poor command of the required language skills of their potential candidates. It is still quite difficult to find appropriate candidates with sufficient foreign language skills on the Slovak labor market.

"The situation on the Slovak labor market tends to be more favorable for university graduates, which means that up to 90% of employers would require higher education of their potential applicants. However, it is very true that candidates without the knowledge of at least one world language often have a serious problem to find a job on the labor market. What does an ideal and most demanded candidate look like? The answer is – an economically oriented graduate with B2 English language level and knowledge of another European foreign language or a graduate mastering both English and German languages on B2 communication level" (Hlavačková, 2017).

The chances to get a job abroad or in an international company knowing just the Slovak language are minimal and so the interest of students in studying foreign languages is constantly growing. Most employers prefer offering interesting work to people who are able to speak English and some other European languages. Bilingualism and multilingualism are becoming an exposed labour market requirement in the international integration process. Foreign language competencies are the basis for intercultural tolerance and for respecting all human and ethical values.

"Foreign language competence is regarded as one of the basic skills that all EU citizens need to acquire in order to improve their educational and employment opportunities.The EU therefore supports the idea that every citizen should master

two Foreign languages in addition to his or her mother tongue" (Holúbeková & Fordosová, 2017).

2   Research and Discussion

In 2017, we monitored job offers of businesses and enterprises in the Nitra region with the goal to identify the employers' requirements, related to their potential applicants, for mastering different foreign languages. One of the stated conditions was to have graduated from university on the 1st, $2^{nd,}$ or 3rd degree levels. Since we were aware of the fact that most graduates want to get employed as soon as possible after they have completed their study, e.g. in the summer months, this was the reason why we narrowed our survey in its final stage and focused on the months of September and October, 2017.

The offers have been selected for graduates of the Slovak University of Agriculture in Nitra from the following websites:
- https://www.profesia.sk/praca/nitra**,**
- https://www.nitra.sk/zobraz/sekciu/zamestnanie**,**
- https://kariera.zoznam.sk/pracovne-ponuky/vsetky/nitra**,**
- https://www.careerjet.sk/zamestnanie-zamestnanie/nitra-224758.html,
- http//praca.sme.sk/praca/nitriansky-kraj.

We have recorded 118 job offers.

In September and October 2017, we carried out research about available job positions in companies and banks in the Nitra region. In order to do this, we used information about job vacancies posted on their websites. Altogether, we found 118 job announcements, including 98 (83.1%) economic job positions and 20 (16.9%) non-economic job offers (Table 1). With respect to available economic jobs, 67 jobs were offered in banks and insurance companies, and 20 positions were offered in other economic sectors. Considering all the found job possibilities, knowledge of English and other foreign languages was required in 36.4% and 11.0% of cases, respectively. This requirement did not exist in 52.6% of vacant positions.

Table 1 **Information about available job positions in companies and banks in the Nitra region**

	Required knowledge of foreign language			Total
	English	**other languages**	**knowledge of foreign language is not required**	
All job positions	43	13	62	118
including:				
1) economic job positions - total of which:	31	11	56	98
- job positions in banks, insurance companies	9	8	50	67
- other economic job positions	22	3	6	31
2) non-economic job positions	12	2	6	20

Source: Authors' calculations based on information placed on websites of companies and banks.

It should be noted that the required knowledge of foreign languages differed significantly for the above-mentioned job categories (Figure 1). For economic job vacancies, knowledge of English and other languages was needed in 31.6% and 11.2% of cases, correspondingly. At the same time, this condition was absent in 57.2% of the announced jobs. It was quite unexpected for us to see that, concerning available jobs in banks and insurance companies, knowledge of English and other foreign languages was required only in 13.4% and 11.9% of cases, respectively. Moreover, for 74.7% of their vacancies, this requirement did not exist at all. Higher requirements were discovered with respect to other job economic vacancies. The corresponding shares were 71.0%, 9.7%, and 19.3%. Somewhat another situation was observed regarding foreign language requirements for non-economic job positions, namely: English - 60.0%, other foreign languages 10.0%, knowledge of foreign language was not required - 30.0%.

Figure 1 **Required knowledge of foreign languages regarding job positions in companies and banks in Nitra region (%)**
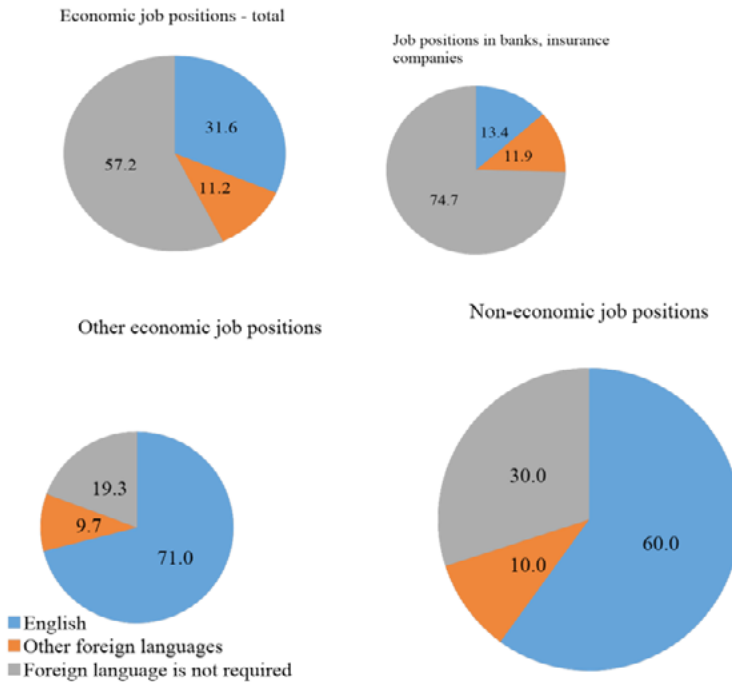
Source: Authors' calculations based on information placed on websites of companies and banks.

As for the level of knowledge of all foreign languages for economic job vacancies, it was mostly required at the B2 (61.9%) and B1 (23.8%) levels (Figure 2). While a similar situation was observed for English, it was somewhat different for other foreign languages, with the higher share of B2 (62.5%) and C1 (37.5%) levels concerning job vacancies of banks and insurance companies and B2 (66.7%) and C2 (33.3%) levels with respect to other economic job offers. For non-economic vacant positions, the B2 (64.3%; 66.7%) and C1 (14.3%; 16.7%) levels were mostly required regarding all foreign languages and English. For job offers connected with knowledge of other foreign languages, requirements were substantially higher. For example, knowledge of foreign language at the C2 level was demanded in 50.0% of cases.

Figure 2 **The required level of knowledge of foreign languages regarding job positions in companies and banks in Nitra region (%)**
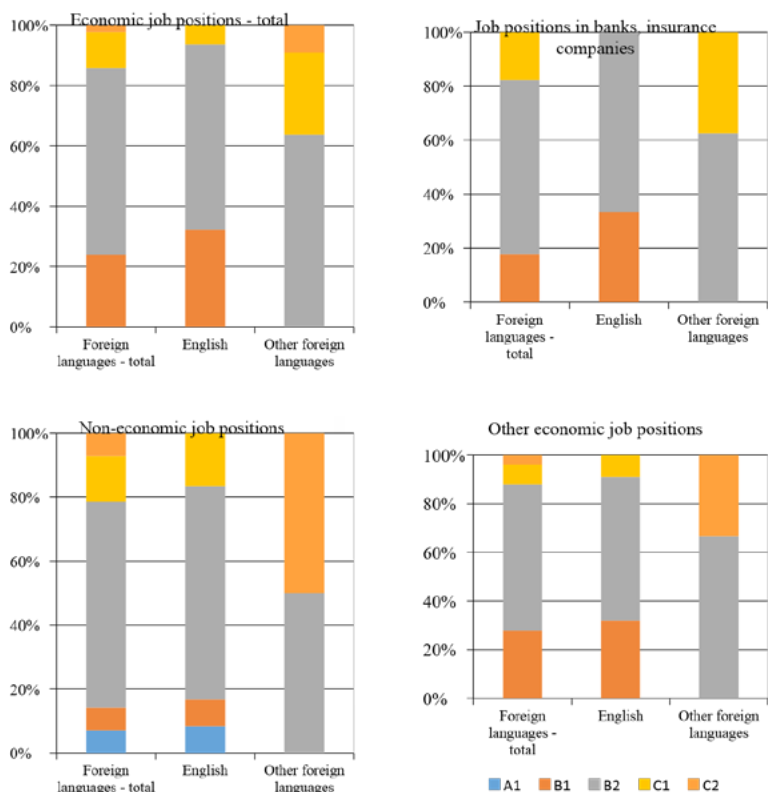
Source: Authors' calculations based on information placed on websites of companies and banks.

According to the ADVANTAGE AUSTRIA survey and the Slovak-German Chamber of Commerce and Industry performed in June 2017, out of 141 participating German and Austrian investors operating in Slovakia, up to 96.5 % consider the knowledge of foreign languages very important for career opportunities. Seven (out of ten) survey participants report that the main profession language for top management is German (43.3%) or English (26,%). Up to 27.7% of the interviewed companies put their emphasis on the fact that their employees had to master both English as well as German languages. Although English is considered the most important international business language in Slovakia, the survey shows that knowledge of German means a real advantage for the career

in Slovakia (Slovensko-nemecká obchodná a priemyselná komora, 2017). A great advantage of English is that it is the top language that can be spoken almost all over the world.

However, if a job seeker wants to work in Europe, his / her options will be limited to countries where English is an official language (England, Scotland, Ireland) or to countries where a large part of the population can communicate in the language. In the countries where English is not an official language, there will be also much less interest in employment possibilities.

In biographies, people mostly claim that their knowledge of the language is active or on the advanced level. However, using the language does not lie only in everyday communication, but in particular in reading foreign publications, viewing films in a given language, etc., which is in fact an excellent experience and the possibility of learning, but it cannot be considered an active use of the language "[3]. To determine the degree of control we now use a scale from level A to C, which means from the basics to the specialized language. Employers are already aware of clear specification of requirements according to this scale.

3   Conclusion

We can conclude from the above monitored results that Slovak companies and enterprises place increasingly more emphasis on a good command of foreign language skills of their applicants. There are more reasons for this. Slovakia has opened up to the world, opening up a gateway to unrestricted opportunities on the labor market. If a job seeker in an international firm wants to apply and be a compatible part of it, if he or she wants to work on the career development, get integrated into the team and become an equal partner in other cultures, it is essential that he or she possesses foreign language skills. Every other foreign language opens up new chances and new opportunities, even where it has not been possible before. The more languages a job seeker knows, the greater the chance for him or her to get an original and well-paid job. And finally, Slovak companies and enterprises want to get a much better access to international or global business markets than it was the case in the past.

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THE PROBLEM OF EMPLOYMENT OF GRADUATES OF AGRARIAN UNIVERSITIES: THE EXPERIENCE OF KAZAN STATE AGRARIAN UNIVERSITY

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Abstract

The main objective of this research is to determine the most successful approaches to staffing of the agrarian economy. The Republic of Tatarstan is an economically successful region of Russia. A significant area of national economy is agriculture, providing a population of primary food products of own production. However, agriculture in Tatarstan is really facing problems of human and labor capacities required for maintenance of innovative development of the agrarian sector, improving the quality of life of citizens in rural areas. In agriculture, representing one of the most important strategic directions of activity of the Russian companies annually go to work no more than 30% of graduates of agricultural universities. Unfortunately, of which 14% not having worked for a year, leaving this sector, as practice shows, to the less skilled but better paid job. On the basis of the complex analysis and system approach investigated the positive experience of the Kazan state agrarian University in shaping the careers of the rural youth in agriculture, formulated the key role of employers and emphasized the need to support the government in employment of graduates of agricultural educational institutions.

Keywords: *education, workforce, cluster, agro-industrial complex, Republic of Tatarstan (RT), Kazan state agrarian University*

JEL classification: *J21,Q10, R23*

1   Introduction

The Republic of Tatarstan is an economically successful region of Russia. A significant area of national economy is agriculture, providing a population of primary food products of own production. Tatarstan took the first place in the official ranking of the subjects of the Russian Federation on the implementation of the State program of development of agriculture. In the Republic conducted a large-scale involvement in agriculture, private strategic investors, private companies, which currently processes half of the Republican arable land and contains half of the livestock. However, agriculture in Tatarstan is really facing problems of human and labor capacities required for maintenance of innovative development of the agrarian sector, improving the quality of life of citizens in rural areas.

The formation of life trajectory and professional career of the young agribusiness professionals occurs in the context of the economic and social transformations of the present Russian society (Abankina T. V., Krasilov, A. N., Yastrebov G. A., 2012). In agriculture, representing one of the most important strategic directions of activity of the Russian companies annually go to work no more than 30% of graduates of agricultural universities. Unfortunately, of which 14% not having worked for a year, leaving this sector, as practice shows, to the less skilled but better paid job.

The main objective of this research is to determine the most successful approaches to staffing of the agrarian economy.

1.1   Specific features of professional adaptation of graduates of agricultural universities

Common to all novice workers the circumstance in the village has its own specific features in professional adaptation of graduates of agricultural universities (Sillaste, G. G., 2004). Among them are negatively influencing their choice of work, namely:
- Features of rural labour.
- Low incomes in rural areas and housing.
- A narrow range of jobs for professionals in rural areas.
- Financial instability of agriculture.
- Features of the image and style of rural life, "rural mentality", a special interpersonal relations between villagers.

In view of the backwardness of rural life and labor among young people:
- Low level of development of socio-cultural and medical infrastructure, consumer services in rural areas.
- Lack of agriculture graduate specialty work in the city.

The prestige of any profession is influenced by its relevance in society as the most desired type of work (Mikheev P. A., 2005). In our opinion, there is another important factor that seriously affects the popularity among young people for agrarian professions. In research and the public opinion of inhabitants of Russia, including Tatarstan, got the idea of the backwardness of rural life and labour. Today's youth, looking to the future, does not want to associate them with the past. A large number of technologies in agricultural production and life in the village change much more slowly than it does in the urban environment. The pace of life in rural areas, reliance on tradition and continuity in contradiction with the values of innovation and information space of the city, its infrastructure. This coincides with the fact that social support or the prestige of working in the agricultural sector, the majority finds no support in the community and the parents of graduates of rural schools.

How to make an attractive life in rural areas and choice of future professional career in the agricultural sector by high school graduates, primarily from rural areas? What life strategies they choose and why? What factors influence this choice? These questions we need to ask in the first place.

Problems of education of youth or rural oriented agricultural professions are the least popular and studied in the scientific literature. This pattern is observed mainly in the industrialized countries, which with some degree of conditionality can be attributed to Russia. According to published materials, for example in the US, despite the fact that the development of the related problems involved practically a professional body, for the reform period 1950-1980-ies of the gap in urban and rural education has become essentially insurmountable. This probably led to the excessive concentration of specialists working on the development of higher education, concentrated mainly in cities (Fedoriaka.And., 2012)., despite the fact that in the U.S. today, more than a third of the total number of schools belong to a rural location.

Their problems and it is not more than 6% of the content of leading journals (Abankina T. V., Krasilov, A. N., Yastrebov G. A., 2012). It can list only some of the most interesting papers relevant to the topic of our project, which determine the main tendencies in this area of research reveal the factors influencing the life strategies of rural students. For example, in one of the works of S. Bian and colleagues (Nezhmetdinova F. T., L. R. Shagivaliev, 2014), where was analyzed the chances of urban and rural students for successful higher education, it was found that traditionally a higher level of social capital in rural communities has a positive effect on the chances in life of people from rural families. American sociologists P. Carr and M. Kefalas (Nezhmetdinova F. T., L. R. Shagivaliev 2014) in their research distinguish four groups of rural students according to their aspirations

and values. The researchers conducted an analysis of the problems each group due to the prevailing in rural America the school system. As a result, they came to the contradictory conclusion that maximum efforts and resources invested in those students who clearly aimed to leave the villages, thereby significantly impoverishing them in the cultural, intellectual, and professional.

Some researchers believe that it is impossible to cope with the problem of "brain drain" from villages to cities. They believe that any investment in development of rural education in the end lead to the fact that the beneficiaries are those of the city, which of these villages seeks the most motivated, educated and skilled young people (Nezhmetdinova F. T. L. R. Shagivaliev, 2014).

There is a perception that the future of the Russian village depends on the goals and values that guide the youth of today, especially in rural areas. While scientists admit that there is a vicious circle: the development of agriculture will be only when will create normal conditions of social life. At the same time, only the progress in agricultural production can ensure the growth of the social sphere of the village.

2   Data and Methods

However, since the beginning of the two thousandth developed countries of the world are actively making the transition to the Bioeconomy, which is characterized by the introduction of breakthrough technologies in agriculture (FAO. 2017). In the agricultural sector rapidly get spread technological innovation: robotics and self-driving farm equipment (Fayzrakhmanov, D.I., Valiyev, A.R., Nezhmetdinova, F.T., & Hamidullin N.N., 2012)., artificial intelligence and information technology (Schwab K. 2015)., the creation of artificial anthropogenic ecosystems, genetic engineering and much more (Nezhmetdinova, F.T. and al., 2015).

All this has set the professional education of agricultural profile the need to develop effective mechanisms to attract, motivate and employment in agriculture for their graduates. Successful experience of solving these problems demonstrates the Kazan state agrarian University of the Republic of Tatarstan occupies a Central place as head of the University scientific-educational cluster of the agro-industrial complex of RT, which also includes 9 institutions of secondary and primary professional education.

Currently Kazan state agrarian university is one of the most stable and dynamically developing universities of the Republic of Tatarstan, providing training of highly qualified personnel agriculture and forestry on more than 20 programs. Kazan state agrarian university actively conducts preparation of students on task order - more than 80% of high school students from rural areas. Vocational

guidance work of the University includes professional education, study and monitoring of the needs in the professions and experts, professional advice, professional selection. This involved the active participation of the Centre for pre-University education and graduate employment (here and after – the Centre) and the Centre for corporate-cluster training. With the aim of popularization of working professions and to engage in agricultural production on the basis of agricultural colleges and agricultural colleges annual national events: competition of youth combine of Tatarstan "Glorify the working man", intellectual game "Beginning farmer" and much more.

To study the experience of employment of graduates of the Kazan state agrarian university was used a comparative approach and a comprehensive analysis of the practice of cooperation with employers, cooperation with state administration bodies and agribusiness.

3   Results and Discussion

At the Kazan state agrarian university, one of the highest rates of employment of graduates majoring in the Russian Federation exceeds 70%. The centre organizes a variety of meetings and events with future employers, to which they invited representatives of the relevant ministries. There come students not only graduate, but 3-4 of the course. Collect information on regions that are communicated to the alumni. Unlike other universities is the so-called "distribution". It usually takes place in April. By this time the majority of graduates know where to work, and provide applications.

In 2013, on the website www.kazgau.com became active the automated information system of employment of graduates of the Kazan state agrarian university. Work is underway to increase the number of direct employers. In order to increase the level of adaptation to the labour market and acquire skills in effective search, the Centre provides individual consultations with students and graduates on employment. In the process of these activities is the promotion of employment, methodological, psychological and organizational support. Collected and analyzed information about the graduates of the Kazan state agrarian university, employed in the organizations and enterprises of agro industrial complex. The analysis reviews the results of the survey of heads of enterprises and institutions shows that University graduates have a high level of theoretical knowledge and practical skills in order to adapt to the conditions of market economy.

Motivation in learning in 2015 on the initiative of the Kazan state agrarian university, in collaboration with the Ministry of agriculture and food of the Republic of Tatarstan, the region has launched a new program of targeted training

of personnel for agriculture. Such training is carried out on the basis of bilateral contracts: enterprise APC is a student.

Agribusiness companies have contracts with the students during the period of their training in the University under which the student is paid a stipend of not less than 10 000 rubles a month, during the entire period of study. The student, after graduation, will work the farm for at least 3 years or in case of refusal to compensate expenses for training. The Ministry of agriculture and food of the Republic on the basis of the decision of the Government of the Republic of Tatarstan on measures of state support of agriculture compensates 50% of the costs for the scholarship students and includes them in the state program of providing housing to young specialists. In addition, according to the agreement, the company is actively involved in the preparation of the student, takes him to practice, assigns a mentor from among the chief specialists of economy, provide after graduation employment with a salary not less than the average in the economy of the region.

This scheme is targeted training is motivated, attractive to young people, and at the same time, greatly increases the liability of each party for decision.

Currently, the program has found interest from businesses and students. So, today, scholars from a variety of agricultural enterprises of the Republic are more than 100 students of Kazan state agrarian university and their number is growing every year.

4   Conclusion

Currently, in the Russian Federation, the Republic of Tatarstan is actively the implementation of national projects in the field of agricultural development and education. However, in the agrarian sector of economy of Tatarstan in recent years there have been major investors (Ziganshin B.G., G.S.Klychova, A.R. Zakirova, G.R. Valieva, A.S.Klychova, 2017). They quite successfully introducing new resource-saving technologies of cultivation of crops with modern high-performance equipment, using the latest technology and highly productive cattle effectively develop livestock farming, erecting a powerful cattle-breeding complexes, renew material-technical base. In the near future it will allow developing agriculture in the Republic of industrial basis. Today agriculture is becoming a high-tech industry of national economy.

However, experience shows that direct investments in the village will not give full value without highly qualified personnel, able to initiate the use of modern technologies. The gap between education and the economy, between education and science, lack of mutual integration of science, higher education and agricultural business to hamper the effective and timely updating the content of

educational programs. Outdated material and technical base of agricultural universities and the high cost of modernization does not allow them to establish a modern database of innovative educational technologies at the expense of own means. Under these conditions, a big problem is the lag of the level of training of the development rate of production.

The present stage staffing formed in the agricultural sector of the economy a contradictory situation. On the one hand, in rural areas fixed a severe shortage of jobs compounded by unemployment. On the other hand, there is acute lack of qualified workers and specialists who can manage the advanced high-tech projects with a progressive style of thinking and doing business.

However, it appears that the enhancement of the prestige and quality of agricultural education needs to strengthen social and corporate interaction with all stakeholders. This requires the following actions:

– diagnosis and comprehensive monitoring of labour market needs in agriculture and rural areas, life strategies of graduates of schools and professional trajectories of the graduates of agricultural educational institutions of services oriented to customers of educational services and scientific results, positions in the agricultural technology and commodity markets, the development of feedback mechanisms stakeholders;

– career planning of students in rural schools and colleges through the organization of career guidance, development and implementation of career planning at all stages of the multi-level agricultural education;

– dissemination and promotion of modern knowledge among residents of rural areas primarily for organization of continuous education of children, youth, and adult population, sustainable development of rural territories and preservation of cultural traditions.

– formation of the state target program of support of young scientists, teachers and graduates of agricultural universities enrolled in self oscillatory short supply who want to work in rural areas (affordable housing; exemption from military service; a decent salary, etc.);

– formation of positive image and prestige of agricultural universities, their employees and trainees, workers in agriculture, generalization and dissemination of advanced experience of agricultural universities, the formation of a Bank of progressive pedagogical technologies, breakthrough scientific research.

The above requires the solution of a broad range of problems. First and fore-most, problems associated with improving the framework and mechanisms of training for the youth of rural territories.

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TERTIARY EDUCATION SYSTEM IN SLOVAKIA

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Abstract

Investments in human capital, including education, skills upgrading, the development of education and science, are nowadays a significant prerequisite for the further development of society and its economic growth. The required features of employees in the current labor market are: flexibility, adaptability and initiative with accountability. The Tertiary Education System should reflect these requirements so that graduates with acquired knowledge, skills and attitudes have been beneficial to employers. In the Slovakia the university education in the first and second grade are provided by: public university, state universities, private colleges and foreign universities. In this context, the main objective of this contribution is the analysis of known indicators of tertiary education in Slovakiain the period 2013-2016. The data sources for the individual indicators were obtained from the database "DATAcube". In particular, these are the following indicators for universities: number of faculties, number of teachers, number of full-time students, number of graduates of the daily study, the number of students studying beside employment. The obtained observations were evaluated by adequate mathematical and statistical methods; respectively by econometric analyzes to obtain information for possible further forecasting of analyzed relationships. Analyzes of indicators of tertiary education in the monitored

period pointed to the existing specificities, homogeneity; respectively heterogeneity of evaluated educational institutions. The obtained results explain more deeply not only the current situation, but they are suitable inputs for adequate proposals for optimization of the tertiary education system in the Slovak Republic.

Keywords: *graduates, mathematical and statistical analyses, system of education, tertiary education, undergraduates.*

JEL classification: *I21, I23*

1   Introduction

Higher education, with its links with research and innovation, plays important role in personal development and economic growth of country (Akhmat et al., 2016). It also confirms Abramo et al. (2014) who say that education, with the resulting of new knowledge creation present the lifeblood of socio-economic growth. Universities are base of the knowledge society. Pechočiak and Kecskés (2016) say that the role of educational institutions in university graduates training in new global space is indisputable. Their role is to respond to the new challenges of globalization and perform graduates training in order to facilitate their successful implementation in the new global environment. Jons and Hoyler (2013) say that the role of universities present key actors in the knowledge economy and they also have important economic, social and cultural impacts on regional development, provide graduates and innovations for the national, regional and local economy.

Higher education is not a closed system, but it is a dynamic system that undergoes various changes. The most significant change in the system of higher education was the adoption of the Bologna Declaration. The Bologna process according to Bendl, Voňková and Zvírotský, (2013) is a result of a series of European conferences and political decisions. It is an agreement among European and some non-European countries which aims to increase availability, attractiveness and quality of higher education in Europe. The Bologna process led to the creation of the European Higher Education Area which presents the three cycles of higher education qualification: bachelors, masters and doctoral degrees. Another authors Pino et al. (2017), Straková, J. et al. (2017) say that regarding the implementation of the Bologna reforms in Europe's universities, there is an obvious increase in investment in higher education as a means of responding to the demands of Europe's developing knowledge societies. After all, Europe's strength derives from the conception of higher education as a public responsibility responding to

societal needs, and this requires the commitment to a long-term and sustainable public funding base in the context of the new European Higher Education Area.

In the last twenty years, Kleňhová (2010) say, that is, in the period since the Velvet Revolution, the society in Czech Republic has significantly changed the view of the importance of the education and has also changed the value of education in the labor market. Together with the development of new industries and changes in the labor market structure, new jobs have emerged, requiring a more skilled workforce. As a basic requirement to the work is required at least secondary education, but more and more positions is required a tertiary education. In addition, wages began to vary to a greater extent, depending on the highest level of education attained. Together with the increasing demand for the tertiary education, universities began to open new studies programmes after 1989 and also is created new public higher education institutions, especially on a regional level and began to since 1999 is created private universities. A similar situation took place in Slovak republic. Today the Slovak education system is currently characterized by a very high and also growing recruitment to universities. Kureková (2010) say the countries with a high measure of graduates of universities have greater potential to develop or maintain a high-skilled workforce. However, its real benefit is decreasing as a result of the devaluation of the value of tertiary education, because the quality of tertiary education is decreasing respectively to adapt to the average standards of the admitted students. The growth of the number of university graduates does not produce the desired effect because the structure of graduates does not meet the expectations and needs of the labor market. She also say, that surveys show that employers' demand for graduates from technical, informational and natural study programs exceeds supply over the longer term, although on average nearly a quarter of universities students undertake mathematical, natural or technical education. Nestorová – Dická (2013) say that increasing the level of higher education increases in proportion to the demand for employment in the labor market, which would adequately offer adequate professions. The countries of Central and Eastern Europe struggle with the post socialist transformation of the economy and the creation of adequate employment for their own economically active population. Of course, the economic crisis has made it difficult for graduates of different levels of education to be employed. However, during the prosperity or economic crisis, the number of the unemployed with the low level of education is higher and the number of the unemployed with the tertiary education is lower.

It also confirm Kuzmišin and Kuzmišinová (2010) who say that one of the main problems of regional development in Slovakia is the insufficient level of economic development potential based on the usage of knowledge, to create new

sources of development is insufficient, and they will still be more built on the usage of creativity, education and skills of the workforce.

2   Materials and methods

Higher education is ranked according to the international classification into category ISCED 5, which includes, besides higher education (5A), also includes the level of higher education (5B), and is collectively named tertiary education.

The main objective of this contribution is the analysis of known indicators of tertiary education in Slovakia in the period 2013-2016. The data sources for the individual indicators were obtained from the database "DATAcube". In particular, these are the following indicators for universities: number of faculties, number of teachers, number of full-time students, number of graduates of the daily study, the number of students studying beside employment.

The observations of numbers of various traits in the Slovak universities were statistically evaluated by the next methods: basic statistical characteristics, Pearson correlations, two factor analysis of variance with the fixed factors: Sciences and Years, Multivariate Analysis of Variance (MANOVA) for the four main traits common for all studied universities on the form of sciences, and by Cluster Analysis, (Johnson and Wichern, 2007). For Statistical elaborations was used statistical package InfoStat [5]. We remark that traits measured as numbers are not usually normally statistically distributed, but for our paper we analyse only primary data.

3   Results

Higher education was one of the first areas where a major reform began after 1998. The basis for reform was the concept of further development of higher education in Slovakia for the 21st century, which was approved by the government in August 2000, and which was also confirmed by the Government's Statement in 2002. The legal basis for the reform was Law No. 131/2002 Coll. about Higher Education which the National Council of the Slovak Republic approved on 21 February 2002 and which entered into force on April, 1, 2002. At present time, has Slovak Republic 5.5 million inhabitants and have 35 universities. For comparison in Italy (Abramo et al. 2014), which has nearly 60 million inhabitants have 96 universities. In Italy, the Ministry of Education, Universities and Research (MIUR) recognizes a total of 96 universities as having the authority to issue legally-recognized degrees. Sixty-seven are public and generally multi-disciplinary universities, scattered throughout the nation. Public universities are largely financed by government through non-competitive allocation.

The analysis follows, that changes in the Slovak higher education system had an impact on the structure and the number of universities and faculties. In Table 1 are means and standard deviations of basic characteristics of the universities in Slovak Republic.

Table 1 **Means, M and standard deviations, SD of numbers of students on the universities of Slovak Republic in the period 2013-2016**

Universities/high schools	Abbrev.	M	SD
Numbers of universities	NU	35.50	0.58
Numbers of faculties	NFAC	130.25	1.50
Numbers of students	NST	122657	9027.9
No. students of SR	NSTSR	117140	9794.0
No. of students of SR -Females	NSTSRF	69238	6314.0
No. of new students in 1st class	STNEWS	45168	3542.1
No. of graduates	ABS	39083	1509.6
No. of PhD. students (total)	STDR	8676	1119.4
No. of students - employed	STEMP	39596	7720.5
No. of Students- employed females	STEMPF	24629	6395.0
No. of new students in 1st class-employed	NSTEMP1	12962	2336.2
No. of absolvents-employed	ABSTEMP	18811	4055.7
No. of professors and lecturers	PROFLECT	4190	102.51
No. of pedagogical employee total	PEDEMP	10627	126.27

Source: Statistical Office of the Slovak Republic, own processing.

Until 2011, there were 33 universities in Slovakia, the number of universities increased to 35 in 2012 and in 2013 the number of universities increased to 36 as a result of the increase of the number of private universities (picture 1). The changes did not reflect for the state universities, which are only 3 in the Slovak Republic and which manage by ministries.

Picture 1 **The structure and the number of universities in Slovak Republic in the period 2008-2016**
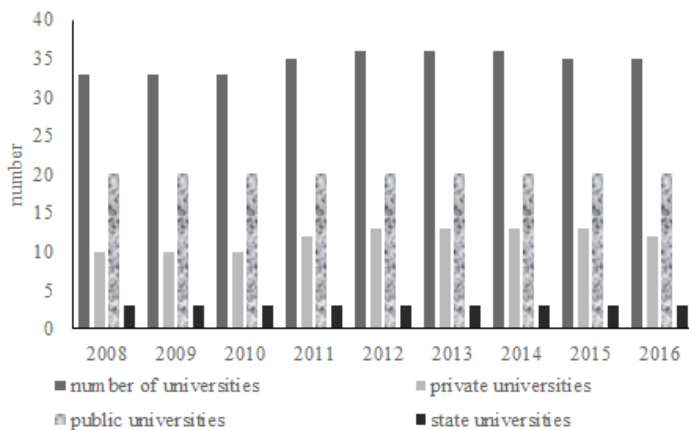
Source: Statistical Office of the Slovak Republic, own processing.

A similar trend can be observed within faculties of universities (picture 2). In the period 2008 - 2012 it is possible to monitor the fluctuating development of the number of faculties of universities. As a result of the increase of faculties at the private universities, the total number of faculties increased in 2009 compared to the previous year. On the contrary, in 2010 there was a decrease of the number of faculties at the private universities, but at the same time the number of faculties at the public universities increased, but in the end total number of faculties decreased. In the next two years increased the number of faculties due to an increased the number of faculties at the public universities and at the private universities. In the period 2013-2015, the number of faculties did not change. The change occurred in 2016, when the number of private faculties decreased. The number of faculties in state universities has not changed throughout the analyzed period.

Picture 2 **The structure and the number of faculties of universities in Slovak Republic in the period 2008 -2016**
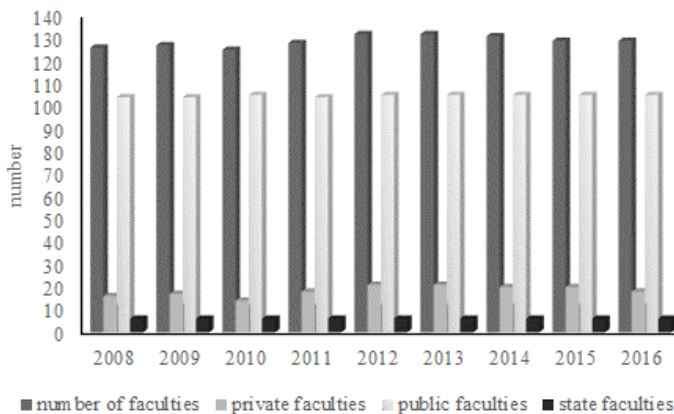
Source: Statistical Office of the Slovak Republic, own processing.

The development of the number of students in the present form are closely linked to the demographic development of the country. This is confirmed the development of the students in the daily form of study (picture 3). In 2009, compared with the previous year, there is a slight increased the number of students in the present form at universities (growth present 2.42%). However, from 2010 to 2012, we are experiencing an annual drop of the students in the present form of study. The number of the students in the present form grew slightly in 2013. From 2013 we can see the annual decrease of students in the present form of study. Compared to 2008 and 2016, the number of students in the present form dropped by 25 255 students, which represents a decrease of 18.39%.

A similar situation is also see in the external form of study. Under the conditions of Slovak universities, external study is paid and from 2013 is also extended from 5 years to 7 years. Bray (2002) in the study say that in Asia education system arguments in favor of fees at the tertiary level are partly based on the substantial private benefits that accrue to tertiary graduates and on the fact that tertiary education has high unit costs that cannot easily be borne solely by governments. Arguments favoring fees are also based on concern for equity. Among tertiary enrollments, students from rich families always form a much larger proportion than students from poor families, and it is widely considered unreasonable to subsidize rich families when that measure will reduce the resources available for

allocation to the poor. It is of course recognized that students from poor families also study in tertiary institutions, and that proportions of such students should be increased. However, since tertiary graduates in general receive greatly enhanced lifetime earnings, it is argued that even the poor can finance their studies through loans that can later be repaid.

This also affected the development of the number of students in the external form of study. Since 2008 their number is decreasing every year and after the amendment of the Law about Higher Education in 2013, which prolonged the external study, the number of students in this form of study dropped compared to the previous year one by 7 795 students, which represents a 13.43% decrease. Compared to 2008 and 2016, the drop of the students in the external study was 48 020 students, which represents 60.15% decrease (picture 3).

Picture 3 **Development of the students and the graduates in the present and external form at universities in Slovak Republic in the period 2008-2016**
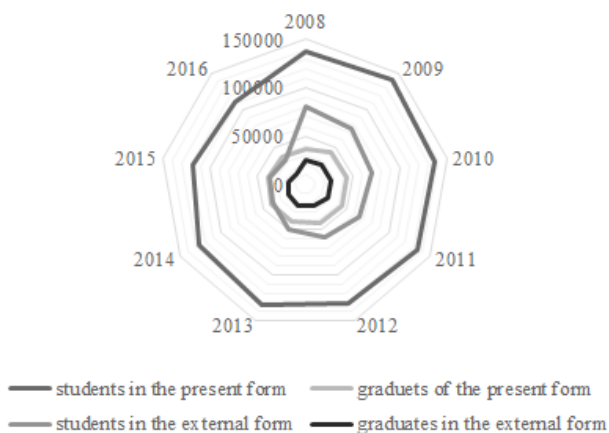
Source: Statistical Office of the Slovak Republic, own processing.

The characterizations of Slovak universities on the form /types of sciences by numbers of various types' students are given by table 2.

Table 2 **Means, M and standard deviations, SD of numbers of students on the various universities of Slovak Republic in the period 2013-2016, n = 4**

University/Sciences	AbbrSci	AbbrST	M	SD
1 Natural science	1NS	NST	2700.30	363.00
1 Natural science	1NS	ABS	2243.00	129.19
1 Natural science	1NS	NSTEMP	142.50	52.65
1 Natural science	1NS	ABSTEMP	243.25	92.77
2, 3 Technical science and education	2TSaE	NST	11404.00	981.23
2, 3 Technical science and education	2TSaE	ABS	8982.50	614.21
2, 3 Technical science and education	2TSaE	NSTEMP	969.25	206.35
2, 3 Technical science and education	2TSaE	ABSTEMP	1055.50	239.29
4 Agricultural, forestry and veterinary science	3AFaVS	NST	1760.30	156.88
4 Agricultural, forestry and veterinary science	3AFaVS	ABS	1402.30	41.14
4 Agricultural, forestry and veterinary science	3AFaVS	NSTEMP	409.00	90.78
4 Agricultural, forestry and veterinary science	3AFaVS	ABSTEMP	370.25	75.90
5 Medical and pharmaceutical sciences and education	4MaPSaE	NST	3342.30	509.59
5 Medical and pharmaceutical sciences and education	4MaPSaE	ABS	2423.80	207.51
5 Medical and pharmaceutical sciences and education	4MaPSaE	NSTEMP	972.25	81.18
5 Medical and pharmaceutical sciences and education	4MaPSaE	ABSTEMP	1890.50	724.90
6, 7 Humanities science and education	5HSaE	NST	23654.00	1882.00
6, 7 Humanities science and education	5HSaE	ABS	21611.00	1117.20
6, 7 Humanities science and education	5HSaE	NSTEMP	9608.00	1900.60
6, 7 Humanities science and education	5HSaE	ABSTEMP	13832.00	3098.70
8 Science and education about culture and art	6SaECaA	NST	1245.30	72.75
8 Science and education about culture and art	6SaECaA	ABS	1141.00	96.71
8 Science and education about culture and art	6SaECaA	NSTEMP	98.25	36.22

University/Sciences	AbbrSci	AbbrST	M	SD
8 Science and education about culture and art	6SaECaA	ABSTEMP	132.25	39.34
9 Military and Security Sciences and Instruments	7MaSSaI	NST	1062.50	158.41
9 Military and Security Sciences and Instruments	7MaSSaI	ABS	1128.80	156.40
9 Military and Security Sciences and Instruments	7MaSSaI	NSTEMP	762.25	94.26
9 Military and Security Sciences and Instruments	7MaSSaI	ABSTEMP	875.75	162.32

Source: Statistical Office of the Slovak Republic, own processing.

Before1989 in the Slovak Republic had predominantly role agricultural sector, heavy and armament industry. Within the transformation of the economy, Slovak republic started to create the conditions for the industrial production, especially on the automotive industry. Kotulič et al. (2014) say that the economic situation in the sectors and industries in Slovakia is not the same, similarly it is in individual regions, where are recorded significant regional disparities. However, this sector is struggling with a lack of qualified workforce. That is why we analysed the students' interest of technical, scientific and agricultural studies. Every year, most students choose technical focus. Nevertheless in the years 2008 - 2016, with the exception of 2009, their number declined each year (pictures 4). Although the number of students enrolled in the first year felling down, the number of graduates of this type of study increased. A similar trend can be observed in the study of natural sciences. Another trend is related to the study of agricultural, forestry and veterinary sciences. Compared to the other study programs, in 2016 compared to 2008 the drop in enrolled the number of students in the 1st year at the agriculture, forestry and veterinary science was the lowest (371 students, which represent 19.08% decrease). The largest drop of students in the first year study in 2016 compared to 2008 had natural sciences - 1541 students, which represents a 40.67% decrease.

Picture 4 **Development of the students and graduates according to the study focus in Slovak Republic in the period 2008-2016**
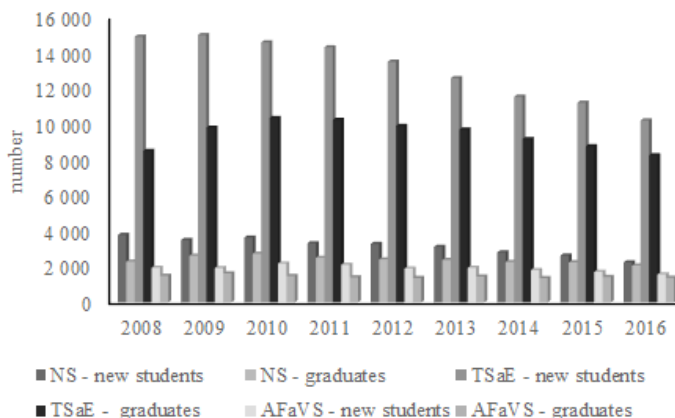
Legend: NS – natural science, TSaE technical sciences and education, AFaVS - agricultural, forestry and veterinary sciences.
Source: Statistical Office of the Slovak Republic, own processing.

In Table 3 are presented Pearson correlations between the numbers of main types of students of analyzed universities in Slovak Republic in the period 2013-2016 years. Correlations were highly statistical significant.

Table 3 **Pearson correlations between numbers of students on the universities of Slovak Republic in the period 2013-2016**

Traits	NST	ABS	NSTEMP	ABSTEMP
NST	1	0.9963**	0.9184**	0.9049**
ABS		1	0.9370**	0.9227**
NSTEMP	** ≤0.01		1	0.9956**
ABSTEMP				1

Source: Statistical Office of the Slovak Republic, own processing.

Shortage of qualified staff and constant struggle for talents along with the retention of most valuable employees belong to the hottest personnel issues for the majority of organizations nowadays (Urbancová and Hudáková, 2017, Várkoly et al. 2012). Higher education gives high prerequisites for employability in the labor market. Nevertheless, it can be observed, that even though this group of

unemployed is the smallest, in the period 2008 - 2013, the number of unemployed with university education increases year-on-year (picture 5). This increase was the result of the economic crisis, which was also reflected in the conditions of Slovakia during this period. At the present time, the majority of students at universities prefer to study humanities science whose employability on the labor market is much smaller compared with the technical sciences. And this may also be one of the reasons for the increasing of the number of the unemployed with university education. The biggest category of unemployed is unemployed with secondary and higher vocational education. It is a bit of a paradox, because many job positions requiring this type of education, employers cannot filled.

Picture 5 **Development of unemployment people according to education in Slovak Republic in the period 2008-2016**
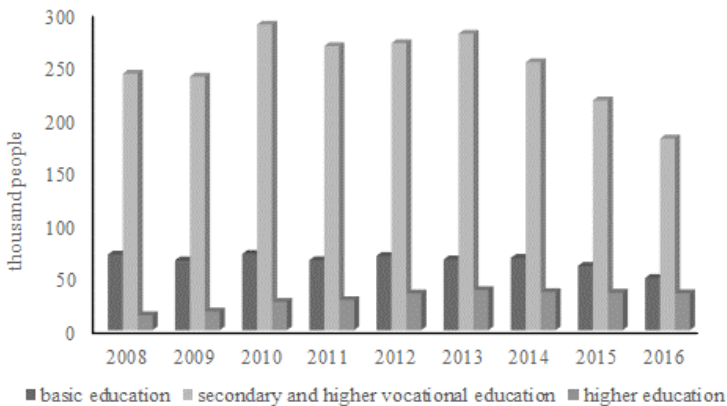
Source: Statistical Office of the Slovak Republic, own processing.

The results from multivariate statistical analysis (MANOVA – multivariate analysis of variance and Cluster Analysis) of the current situation of total 36 universities in the Slovak Republic in the period between 2013-2016 years (structure of universities by various traits, e.g. numbers of students of various classes, numbers of graduates number of PhD. students, number of employed students and their graduates) showed that there are differences between analysed universities of on the basis of their study focus (Table 4)

Table 4 **The Hotelling test (Bonferroni adjustment test) from two factor mutivariate analysis of variance (Sciences, Years), n = 4, Error** *term based on the Pooled covariance matrix, with df =18, on the significant alpha level = 0.05*

Science	NST	ABS	NSTEMP	ABSEMP	Homogeny groups			
2TSaE	11403,50	8982,50	969,25	1055,50	A			
5HSaE	23653,50	21611,25	9608,00	13832,00		B		
4MaPSaE	3342,25	2423,75	972,25	1890,50			C	
1NS	2700,25	2243,00	142,50	243,25			C	
7MaSSaI	1062,50	1128,75	762,25	875,75				D
6SaECaA	1245,25	1141,00	98,25	132,25				D
3AFaVS	1760,25	1402,25	409,00	370,25				D

Means with a common letter are not significantly different (p > 0,05)
Source: Statistical Office of the Slovak Republic, own processing.

The medical/physician and natural universities create the common class, and greater class create military, cultural and agricultural universities. The differences between analysed traits by years are not significant. The Cluster Analysis by method K – means showed on the similar situation.

4   Conclusion

The analysis showed that the number of students at university in both daily and external form is annually decreasing. The reason for the decline is demographic changes in society, but also the fact that a big part of graduates of secondary school are leaving to study abroad. Another reason is the insufficient employment of graduates in the labor market in the focus who they studied. Absent links between universities and practice to resulting in discrepancy in supply (the structure of studies programs and competency profile of graduates) and demand (employers' demands) in the labor market.

The results of multivariate statistical analysis showed that there are differences between analysed universities of on the basis of their study focus. Also the analysis show, that the number of students in the technical and natural science decrease, despite the fact that their application on the labor market is much higher compared with the students of humanities science.

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INVESTIGATION OF A NONLINEAR DEPENDENCE BY THE LEAST SQUARES METHOD

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Abstract

Sometimes it is necessary to express the dependence of one quantity on one or more other quantities. The relationship between two variables can be expressed by a so-called trend curve. This dependence can be either linear or non-linear. In the paper we express a non-linear dependence, in our case quadratic, by means of the least squares method and outline how this method can be used to derive a set of equations enabling us to determine the coefficients of the given trend curve. We deal with a practical example of a small poultry farmer who breeds chickens for egg production. By this method we can estimate, for example, the missing data that have been lost or failed to be obtained and are necessary to document the production results.

Key words: *quadratic function, least squares method, nonlinear dependence*

JEL classification: *C1, C4, C13, C02, C65*

1   Introduction

At the Slovak University of Agriculture in Nitra students learn the concept of a function of two or more variables not only in mathematics but also in other subjects, especially at the Faculty of Engineering. Országhová, Gregáňová, Pechočiak, Farkašová, Drábeková & Kecskés (2014) introduce and describe these functions and their properties in their textbook, further they deal with partial derivatives, local and constrained extremes etc.

In practice we encounter situations when it is necessary to express the dependence of one variable on one or more other variables. The relationship between two

variables can be expressed by a regression curve (sometimes called a trend curve). This dependence can be either linear or non-linear.

We talk about linear dependence if it is possible to express the relationship between the dependent variable y and the independent variable x by the equation $y = a_0 + a_1 x$, where a_0 a a_1 are the coefficients (real numbers).

Non-linear dependence can be characterized, for example, by a logarithmic, exponential or power function. All these functions can be converted by proper transformations to a linear function, expressed by the equation $Z = b_0 + b_1 u$, (e.g. Pechočiak, 1997). Hence the logarithmic function $y = a_0 + a1 \log_a x$ can be converted to a linear function by transformations $z = y$, $u = \log_a x$, $b_0 = a_0$ a $b_1 = a_1$. The exponential function $y = a_0 * a_1^x$ by transformations $z = \log y$, $z = x$, $b_0 = \log a_0$ a $b_1 = \log a_1$ and the power function $y = a_0 * x^{a1}$ by $z = \log y$, $u = \log x$, $b_0 = \log a_0$ a $b_1 = a_1$.

Coefficients b_0 a b_1 of the regression straight line are usually determined by the least squares method which involves partial differentiation.

The regression curve, except for the logarithmic, exponential and power function described above, can also be represented by a graph of a polynomial function of degree n with $n+1$ parameters (coefficients) a_i, $i = 0,1,2,\ldots,n$.

2   Data and methodology

A polynomial function of degree 2 is called a quadratic function. The relationship between the dependent variable Y and the independent variable X is given by the function $Y = A_0 + A_1 X + A_2 X^2$, whose graph is a parabola. Its estimate is the function

$$\bar{y}_1 = a_0 + a_l x_i + a_2 x_i^2 \quad (1)$$

The coefficients a_0, a_1, a_2 can be estimated by the least squares method.

Also Moroz, Nagy, Bilan, Horská & Poláková (2017) in their paper used the method of regression and correlation analysis based on the least squares method, where they dealt with the export and import of goods and services between Ukraine and V4.

So what is this method based on? We create differences between real (empirical) values y_i and estimated values $\bar{y}_i$. These differences are then squared in order to minimize the errors that would result from their addition. By adding up the squares of these differences we create a function

$$F = \sum_{i=1}^{n} (y_i - \bar{y}_i)^2 = \sum_{i=1}^{n} y_i - \left(a_0 + a_1 x_i + a_2 x_i^2\right)^2 = \sum_{i=l}^{n} \left(y_i - a_0 - a_1 x_1 - a_2 x_i^2\right)^2 \quad (2)$$

The coefficients a_0, a_1 a a_2 are considered as unknown. Our task is to find the least difference between the measured and estimated values, i.e. to find the minimum

of the function F. In order to find this minimum, we use the necessary condition theorem for functions of more variables.

Theorem: Let the function F be differentiable and have a local extreme at the point A. Then the first partial derivatives at this point are equal to zero.

We compute the first partial derivatives of F:

$$\frac{\partial F}{\partial a_0} = -2 * \sum_{i=1}^{n}\left(y_i - a_0 - a_1 x_i - a_2 x_i^2\right),$$

$$\frac{\partial F}{\partial a_1} = -2 * \sum_{i=1}^{n}\left(y_i - a_0 - a_1 x_i - a_2 x_i^2\right) * x_i,$$

$$\frac{\partial F}{\partial a_2} = -2 * \sum_{i=1}^{n}\left(y_i - a_0 - a_1 x_i - a_2 x_i^2\right) * x_i^2,$$

and put them equal to zero:

$$-2 * \sum_{i=1}^{n}\left(y_i - a_0 - a_1 x_i - a_2 x_i^2\right) = 0,$$

$$-2 * \sum_{i=1}^{n}\left(y_i - a_0 - a_1 x_i - a_2 x_i^2\right) * x_1 = 0,$$

$$-2 * \sum_{i=1}^{n}\left(y_i - a_0 - a_1 x_i - a_2 x_i^2\right) * x_i^2 = 0,$$

which is

$$\sum_{i=1}^{n} y_i - \sum_{i=1}^{1} a_0 - \sum_{i=1}^{1} a_1 x_i \sum_{i=1}^{1} a_2 x_i^2 = 0,$$

$$\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{1} a_0 x_i - \sum_{i=1}^{1} a_1 x_i^2 - \sum_{i=1}^{1} a_2 x_i^3 = 0,$$

$$\sum_{i=1}^{n} x_i^2 y_i - \sum_{i=1}^{1} a_0 x_i^2 - \sum_{i=1}^{1} a_1 x_i^3 - \sum_{i=1}^{1} a_2 x_i^4 = 0,$$

and

$$\sum_{i=1}^{n} y_i = n * a_0 + a_1 * \sum_{i=1}^{1} x_i + a_2 * \sum_{i=1}^{1} x_i^2,$$

$$\sum_{i=1}^{n} x_i y_i = a_0 * \sum_{i=1}^{1} x_i + a_1 * \sum_{i=1}^{1} x_i^2 + a_2 * \sum_{i=1}^{1} x_i^3,$$

$$\sum_{i=1}^{n} x_i^2 y_i = a_0 * \sum_{i=1}^{1} x_i^2 + a_1 * \sum_{i=1}^{1} x_i^3 + a_2 * \sum_{i=1}^{1} x_i^4 \quad (3)$$

The system (3) is called the system of normal equations. By solving this system we find the coefficients a_0, a_1 a a_2, which represent the estimations of A_0, A_1 a A_2 in the regression parabola.

3   Results and discussion

The dependence between two variables is often represented by a polynomial function. Let's consider the following scenario:

A small farmer breeds chickens. Throughout the year he has about 30 of them. Their daily laying ranges from 10 to 30 eggs, depending on the season. He recorded and calculated the average daily laying per each month throughout the year. However, in August he vacationed and his assistant worker did not register the daily laying counts. The farmer sent us his counts at the end of the year and asked us if we could calculate or estimate the missing values for August. The obtained data were recorded in the table (Table 1) and then plotted in the graph (Figure 1). When the plotted points were approximated by a curve, we found that this curve resembles the regression parabola (in Figure 1 the red line).

Table 1 **Average daily number of eggs per individual months**

m_i	1	2	3	4	5	6	7	8	9	10	11	12
P_i	13	16	19	22	24	25	24		20	17	14	10

m_i–month (1 corresponds to January, 2 to February, …, 8 to August, …, 12 to December)

P_i – average daily egg laying per individual months
Source: Own.

Based on this figure we decided to approximate the equation of this curve by means of the least squares method. After its mathematical expression we can estimate the missing value of the daily average number of eggs in August.

Figure 1 **Average daily number of eggs per individual months with a regression curve**
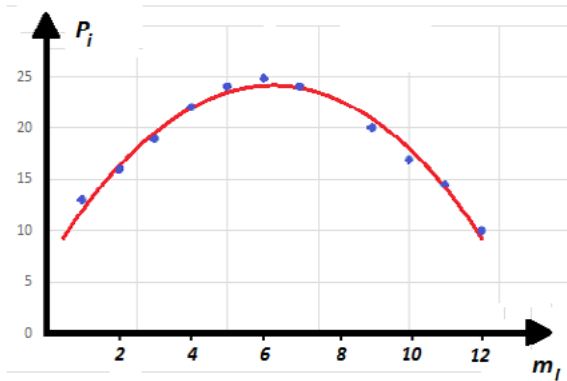
Source: Own.

Table 2 contains the data obtained from the farmer and some auxiliary computations necessary to determine the values in the system of normal equations.

Table 2 **Table of auxiliary data**

m_i	P_i	m_i^2	m_i^3	m_i^4	m_i*P_i	$m_i^2*P_i$
1	13	1	1	1	13	13
2	16	4	8	16	32	64
3	19	9	27	81	57	171
4	22	16	64	256	88	352
5	24	25	125	625	120	600
6	25	36	216	1296	150	900
7	24	49	343	2401	168	1176
9	20	81	729	6561	180	1620
10	17	100	1000	10000	170	1700
11	14	121	1331	14641	154	1694
12	10	144	1728	20736	120	1440
Σ	70	204	586	5572	56614	1252	9730

Source: Own.

Values from the last row in Table 2, i.e. the sums, were plugged into the system of normal equations (3), where m_i stands for x_i and P_i stands for y_i and n is equal to 11. So

$$204=11*a_0+70a_1+586a_2,$$

$$1252=70a_0+586a_1+5572a_2,$$

$$9730=586a_0+5572a_1+56614a_2 \qquad (4)$$

This system of equations can be solved by different methods, e.g. by the Gaussian elimination method. However, we can use a programmable calculator or a program freely available on the Internet. In the paper we used the hackmath.net (2017) page.

Solution of (4) yields the coefficients $a_0=7{,}5952$, $a_1=5{,}3393$ a $a_2=-0{,}4322$ (values have been rounded to four decimal places). We plug these coefficients into (1),

$$\bar{y}_i = a_0 + a_1 x_i + a_2 x_i^2,$$

and we get

$$P_i = 7{,}5952 + 5{,}3393 * m_i - 0{,}4322 * m_i^2.$$

For the 8-th month we have

$$P_8 = 7{,}5952 + 5{,}3393 * 8 - 0{,}4322 * 64,$$

then

$$P_8 = 22{,}6488.$$

Hence the average number of eggs laid in August was 23.

Inspection of Table 1 shows that this value could fit the real average daily number of eggs laid in August.

4   Conclusion

Real functions of two or more real variables and their partial derivatives have vast applications in various fields and everyday practice. Very often, it is necessary to determine the local extremes of these functions, i.e. their minimum or maximum. We also encounter situations when it is necessary to estimate some function or its parameters by the regression and correlation analysis, as we mentioned above. In the paper we outlined a solution of a problem of estimation of a non-linear polynomial (quadratic) function by means of the least squares method. This method also serves to estimate the parameters and the behavior of such functions. By this method we estimated the missing average daily number of eggs laid in August.

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STUDY OF AGRICULTURAL SCIENCES AND EMPLOYMENT OF GRADUATES

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Abstract

The aim of the paper is to evaluate the development of the unemployment rate of graduates of agricultural sciences in the comparison with the other study programs. Through the cluster analysis we identify the districts with the largest number of these unemployed graduates. Education has a key role in the socio-economic development of the country. Human capital is the key for the development not only at national level but also at regional or local level. The result of education in the agricultural sciences is a graduate who can effectively use the theoretical knowledge gained directly in practice. In the education of the agricultural sciences, we apply knowledge triangle resulting in integrated farming knowledge. This brings about the interconnection of agricultural education with the agriculture leadership and research and consultancy in this field. Only if will be protect an effective transfer of information between these three components is ensured is it possible to talk about a successful graduate in the field of agriculture. Although the analysis of unemployed graduates within individual study´s programs revealed, that such graduates constituted only 3.96 % of the total number of unemployed graduates in September 2017, this is not the result of the high labor market applicability of these graduates, but it is related to a decreasing of number of students who studying the agricultural sciences. One of the tools which currently used to improve the quality and motivation of students to

study agricultural science is the dual education. Unfortunately, even the application of this tool did not contributed for the attractive of this study. According to the opinion of the Slovak Agricultural and Food Chamber, the secondary schools but also universities offered attractive studies programs in the agriculture, but the students' interest of these programs is minimal. Another option is to intensify the cooperation of schools directly with business entities by creating training centers focused on lifelong learning directly arising from the needs of agricultural practice through the application of modern teaching methods. Through the successful graduates it will be possible to ensure the competitiveness of the Slovak agricultural.

Key words: *Education, agricultural sciences, graduates, unemployment*

JEL classification: *I21, E 24, Q18*

1   Introduction

Human capital is the ability of person to create new knowledge (innovation) that is inseparable from the person. It does not have a matter - of - fact and is associate with the physical form of a person. Cannot stored him and cannot to protect him on the bank account. Human capital belongs to a group of relatively renewable production sources, and present the great importance for the economy. It is not subject of personal property and it is not subject for the purchase and sale of other entities, other than the person who has these capabilities (Krajňáková and Vojtovič, 2012, Váchal and Pártlová, 2008). Creating human capital by Dobeš (2003) means working with every person and educating them. It is an area in which economics is confronted with psychology, pedagogy and other sciences dealing with the human capital. Even investments into human capital do not go as far as the investment into the physical capital. This makes it difficult to observe the relationships between human capital and other economic variables.

The impact of the state on the amount of human capital in the economy is monitored through a number of specific institutions. Primarily, these organizations present schools of all levels, further education organizations, training facilities, learning facilities, the academies of sciences and others. In this process also are active indirect institutions - libraries, internet, audio didactic tools, pedagogical programs and more. So, the state does not invest directly to the person, but in institutions that increase human capital of persons (Dobeš, 2003). The need to continuously acquire new knowledge, skills and practice however, continues even after obtaining a certain level of education. This option offers further education as a part of lifelong learning (Kolláriková, 2014, Klímová and Žítek, 2015). It also confirm Porubčinová (2011) who say that from the point of view of developing

and shaping human capital, lifelong learning encompasses, in addition to school education and in-service training, enterprise education structures and the full range of formal and non-formal education. Others authors Balážová, st. and Balážová, ml. (2006), Baková and Lešková (2015) say that is very important to learning the students on the universities not only theoretical aspects but also practical skills, so that they can bring these benefits into their first job. However, this presupposes the alignment of the requirements of practice with the offer of higher education institutions in the field of trade union structure and competency profile of students It confirm also Brožová (2003) who mention, that higher education as a prevention against unemployment in the context of greater adaptability to changing labor market demands. In addition Kolláriková (2014) note that in the current turbulent environment, it is important to offer actually the skills and knowledge, which to facilitate the transition from school to employment, or which to help to get quality employment within study programme or to apply abroad. The school system should be flexible.

Education is an important factor in supporting employment of the population in the rural area, for the labor force flexibility and diversification activities through the form of new methodologies and techniques in education (Ferenczi Vaňová and Krajčírová and Váryová and Košovská, 2015). According to Horská and Ubrežiová and Palková, (2015) universities are searching possibilities how to attract students, how to offer high quality education and how to bring value added and differentiation to the university education. Competitive environment around us generates need of high quality, unconventional and innovative solutions in the sphere of higher education everywhere in the world. Bologna process is one of those approaches enabling harmonization and mutual cooperation of universities around the world. It confirm also Matušek and Drábeková and Országhová and Farkašová (2016) who note that the quality of higher education and the increasing competitiveness of universities are subject to continuous updating of the academic content as a result of interaction with the requirements for university graduates in the labor market. According to Polakovič and Slováková and Hennyeyová (2016) modernization of educational system is a base for development of qualification of labor force of each organization on all its levels.

The application of modern trends in the training of agricultural experts and the system of lifelong learning in the agriculture is tool for ensuring the competitiveness of this sector. It confirm Kapsdorferová and Sviridová (2016) who mention that agricultural university education is one the most important instruments, which can provide economy with new specialists in agriculture on the one hand and renew specialists (in case of upgrade qualifications) on the other hand, who could face contemporary agricultural challenges. Also The Ministry of

Agriculture and Rural Development of the Slovak Republic supports the better use of material, technical and personnel capacities on the secondary agriculture schools in linking to the realization of lifelong learning in the form of educational activities, conferences, seminars, etc. (Strategy of education in the agriculture sector in Slovak republic 2007-2013, 2013).

At the present time the new economic situation in the information society opens up a discussion of changes in the nature or value of work. Work is not perceived in the information society only as an instrument of the economic process (Porubčinová, 2011). Feng and Graetz (2017) provides in their study, which suggest that employers when recruiting new employees, they trust about graduates' abilities who acquired in the universities. They find that higher education positively affect a graduate's probability of working in a high-wage industry six months after graduation. It confirm also Švarcová and Gabrhel and Cícha (2014) who mention that in the context of the research on the unemployment of graduates, the problematic interface between economic inactivity and the commencement of economic activity after graduation is the transition from a regular daily study to the first work. In the Czech Republic, according to the authors, an unemployed graduate represents the person who registered at a job office and who successfully completed school maximally not more than two years ago. Kabát, et al. (2014) note that extraordinary acute problem of unemployment and poverty incidence is linked with the young people under the age of 25 years. In some EU countries (Spain, Greece) it affects more than 50 % of population in this age group. There is no doubt, that unemployment represents currently the major social problem of the European Union. Its consequences are, however, evident in long lasting growth of social tension over various social groups and the entire society. In the Czech Republic, the unemployment rate of university graduates according to the Ministry of Labor and Social Affairs of the Czech Republic expresses the share of unemployed graduates in the difference between the total number of graduates and the number of graduates who continue to study at college (Švarcová and Gabrhel and Cícha, 2014).

2   Data and methodology

The basic data using for analysis were publicly available databases published by the Office of Labor, Social Affairs and Family of the Slovak Republic and also by the Statistical Office of the Slovak Republic. The data were analyzed in the time periods 2008-2011 and 2014-2017. Data for 2012-2013 are not available due to changes in the recording and subsequent data processing by the Office of Labor,

Social Affairs and Family of the Slovak Republic. The number of graduates and unemployed persons is reported as at 31 September of the year under review.

The acquired data were primary calculated in the programme Excel and subsequently analysed in the programme SAS. The method of average linkage was utilized for the individual cluster creation which use according to Stankovičová and Vojtková (2007) leads to the similar results as the method of furthest neighbour. Its principle is inhered in the aggregating of two clusters to one new cluster if there is an average minimal distance between them. The distance between clusters (1) is defined as the average from inter cluster distances of objects d_{ij}, i.e.:

$$D\ C_h, C_h^{'}\ = \frac{1}{n_h n_h^{'}} \sum_i \sum_j d_{ij} (1),$$

where n_h and $n_h^{'}$ are the numbers of objects in the cluster C_h and $C_h^{'}$.

The cluster analysis and its outputs are simultaneously the input elements for the expression of levels and developments of interregional differences in Slovakia. It is indispensable as well as for the reveal of mutual and differentiated reasons of lags respectively progress of particular regions. The higher number of indicators is used (as regards their availability in time and in regional dimension), the regional status and the development in Slovakia are more complexly described (Chomjaková and Suchý and Kožiak, Daxnerová, 2016).

3   Results and discussion

Unemployment among graduates is, in our view, to be examined not only by length of registry at the employment office but also by the territorial structure. The dendrogram (Picture 1) shows the process of aggregation of universities in the Slovak Republic, which were reported at least 10 job seekers in the analyzed period. This condition was fulfilled by 27 universities, which were classified into 6 clusters on the basis of the classification characteristics of clustering.

Picture 1 **Dendrogram of universities in the Slovak Republic according to the district of unemployed graduates in 2017**
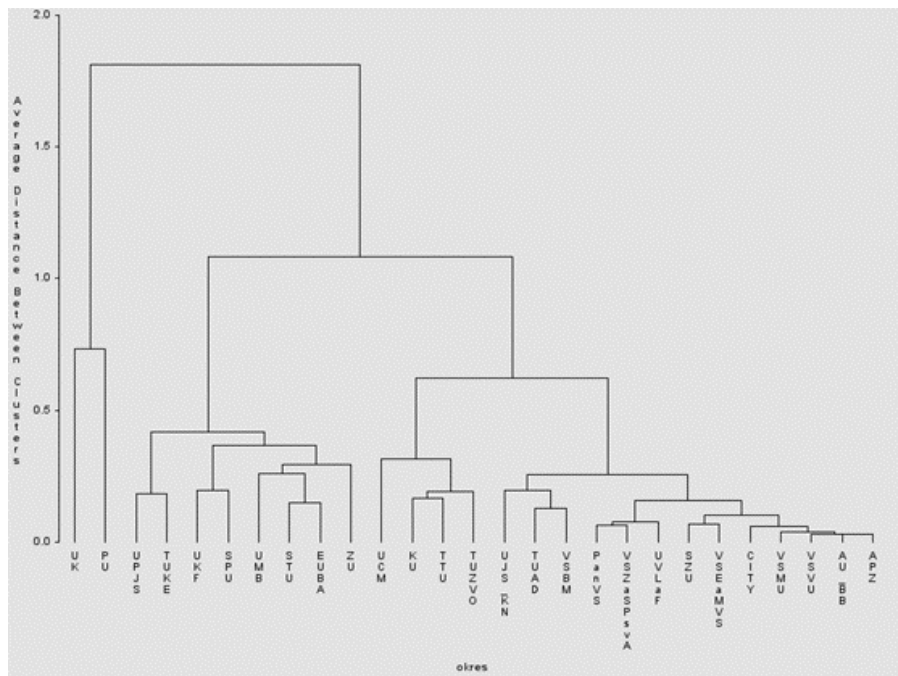
Source: Own processing.

The first and most numerous cluster is made up of 13 universities characterized by the fact that their graduates have a highly specific profile (all art schools), but also all private and state universities are included in this cluster. The second most frequent cluster is made up of 6 universities whose graduates come from the whole territory of the Slovak Republic. Similarly, graduates of Comenius University in Bratislava come from the whole Slovak Republic, but with the highest number of 561 (10.71%) of all registered unemployed graduates, it belongs to cluster 6. The University of Presov had 451 unemployed graduates, who present 9.36% of the total number of university graduates, but as many as 96.01% of all graduates are from the closest regions - Prešov and Košice so belongs into separate cluster 5. This trend is similar to Pavol Jozef Šafárik University in Košice and Technical University of Košice, but the number of graduates registered as job seekers is lower (280 or 311), so they form a separate cluster 4 (Table 1).

Table 1 **Clusters of universities in the Slovak Republic according to the place of registration of their graduates as job seekers in 2017**

Cluster	Number	Name of universities
1	13	Academy of Arts, Academy of the Police Force, Academy of Fine arts and Design
		College of Music Arts, The School of Management in Trenčín, Pan- European University
		Slovak medical university, School of Economics and Management of Public Administration in Bratislava
		St. Elisabeth University of Health Care and Social Work,University of Security Management in Košice
		Alexander Dubček University of Trenčín
		J. Selye University, *University of Veterinary Medicine and Pharmacy in Košice*
2	6	University of Economics, *Slovak Agriculture University*, Slovak University of Technology in Bratislava
		Constantine the Philosopher University in Nitra, Matej Bel University, University of Žilina
3	4	Catholic University in Ružomberok, University of Trnava, *Technical University in Nitra*
		The University of Ss. Cyril and Methodius
4	2	Technical University of Košice, Pavol Jozef Šafárik University in Košice
5	1	Comenius University in Bratislava
6	1	University of Presov

Source: Own processing.

These factors also influenced the formation of clusters of the registers of unemployed graduates of universities. In this case, 79 districts were divided into 8 clusters as the most appropriate possibility of dividing. From the point of view of the aggregation process as well as the previous findings, the result can be considered as expected (Table 2).

Table 2 **Clusters of districts of the registry of graduates as job seekers in the Slovak Republic in 2017**

Cluster	Number	Districts forming a cluster												
1	50	MY	BS	BN	ZC	RA	KE3	TR	SP	SO	LC	RS	MA	SC	PT
		DT	HC	GL	NM	BA3	BA5	BA1	PN	SI	KK	LE	VK	IL	ML
		PU	BY	TS	ZH	DK	LM	BR	ZV	PE	KA	BA2	TO	ZM	SE
		KM	GA	PK	SA	RV	DS	KN	LV						
3	11	HE	VT	KE1	KS	MI	PP	SL	TV	SN	SB	DJ			
3	13	PB	MT	SV	SK	KE2	KE4	CA	NO	PD	NZ	RK	TN	BB	
4	1	BA4													
5	1	TT													
6	1	ZA													
7	1	NR													
8	1	PO													

Source: Own processing.

The last 3 clusters - 8, 7 and 5 are made up of only one district (Picture 2) where at least 2 universities have their headquarters included into the survey. The cluster 6 is similarly created only for one district, namely the district of Žilina, in this district located only one university in town Žilina.

Picture 2 **Dendrogram of districts of registry of unemployed graduates in Slovak Republic in 2017**
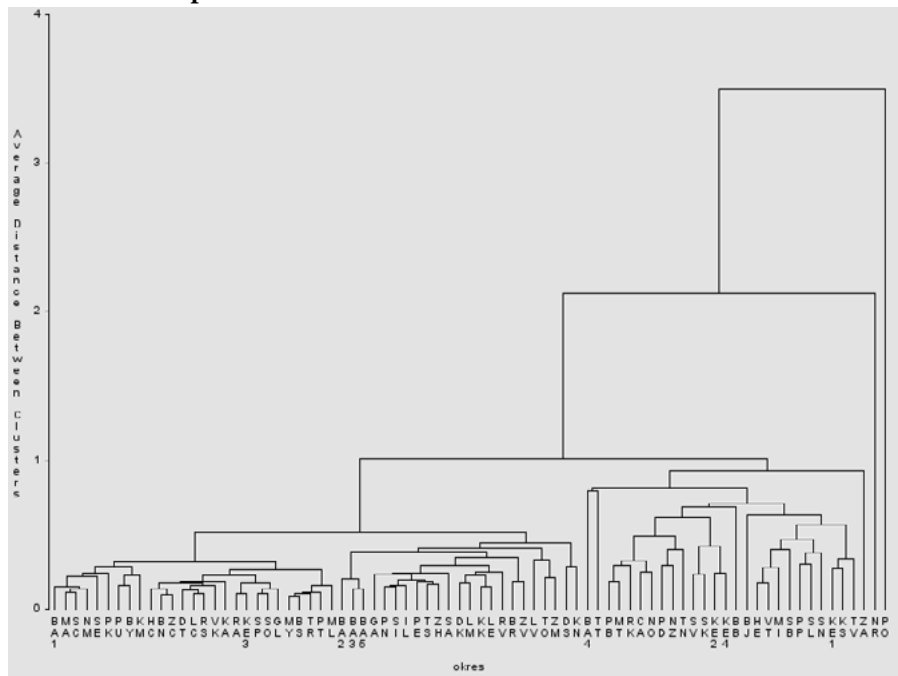
Source: Own processing.

The number of graduates of the first and second level of study reached a maximum in the analyzed period in 2011 - 43,872 graduates, which is 40% more than in the last academic year 2017 - 31,164 graduates (Picture 3). The picture 1 also show that the share of graduates in the field of agricultural sciences has increased, when their long-term average share was 3.70% but in 2017 the share increased on the 4.20%

Picture 3 **Development of the number of university graduates and the share of graduates in the agricultural sciences in Slovak Republic**
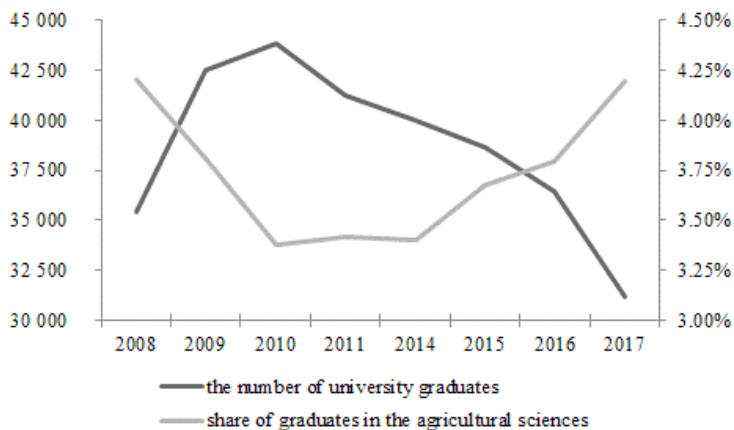
the number of university graduates

share of graduates in the agricultural sciences

Source: Statistical Office of the Slovak Republic, Office of Labor, Social Affairs and Family of the Slovak Republic, own processing.

Of the total number of university graduates, on average 16.79% of them were registered on a yearly basis as applicants for employment. University graduates in the agricultural sciences form long term about 10.43% of applicants for employment (Picture 4). These rates of registered unemployment of both groups of university graduates are predominantly higher than the overall registered unemployment rate in the Slovak Republic. For this reason, we also need to analyze the structure of unemployment according to the length of the period of unemployment.

Picture 4 **Development of the share of university graduates registered as job seekers in the Slovak Republic**
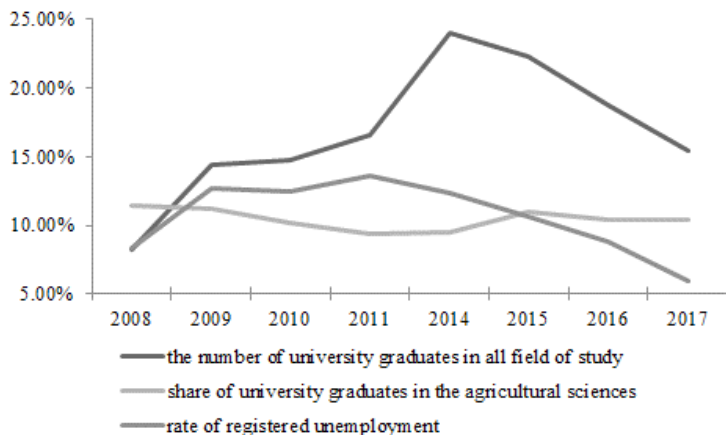
Source: Statistical Office of the Slovak Republic, Office of Labor, Social Affairs and Family of the Slovak Republic, own processing.

From a time perspective, the length of the period of unemployment is definitely the biggest group of graduates whose length of unemployment lasts 3-6 months, as graduate examinations are carried out in May - June and data from graduates' register are annually at 31 September. Share of unemployed graduates who have been registered for more than 6 months are falling sharply, with the exception of unemployed persons registered for more than 12 months who reaching values below 0.5%. Since 2014, the share of unemployed graduates registered for more than 12 months risen sharply (Table 3).

Table 3 **Number of graduates registered as unemployed by length of registry in Slovak Republic**

	Year		2008	2009	2010	2011	2014	2015	2016	2017
	Graduates		35 400	42 508	43 872	41 245	39 953	38 649	36 427	31 164
N u m b e r	graduates registered as unemployed	total	8.20%	14.44%	14.72%	16.51%	24.01%	22.28%	18.72%	15.46%
		0-3 month	2.73%	3.80%	3.44%	3.44%	4.31%	4.71%	4.43%	4.58%
		3-6 month	5.15%	10.14%	10.44%	11.94%	16.61%	15.18%	12.61%	9.96%
		6-9 month	0.08%	0.16%	0.19%	0.25%	0.48%	0.41%	0.27%	0.21%
		9-12 month	0.05%	0.09%	0.13%	0.12%	0.28%	0.23%	0.17%	0.10%
		13-15 month	0.06%	0.13%	0.25%	0.34%	2.30%	1.72%	1.22%	0.60%

Source: Social Affairs and Family of the Slovak Republic, own processing.

These trends apply to the group of graduates in general but are more pronounced in the group of graduates of agricultural sciences. The share of unemployed graduates of the agricultural sciences who are registered at the Labor Office represented 5.17% of the total number of unemployed graduates in 2008. In 2017, the share has increased to 6.89%. Changes within this category of unemployed graduates of agricultural sciences were only minimal in the analyzed period. Different development can be observed in the case of unemployed graduates of agricultural sciences who are registered at the employment office for 3-6 months. While in 2008 these graduates accounted 16.06% of the total number of unemployed graduates, in 2017 their share represented 29.3% of the graduates. The annually increasing of the share of these graduates we can see in the 2009-2015 (picture 3).

Picture 5 **Share of graduates of agricultural sciences registered as job seekers in the Slovak Republic according to the length of registry**
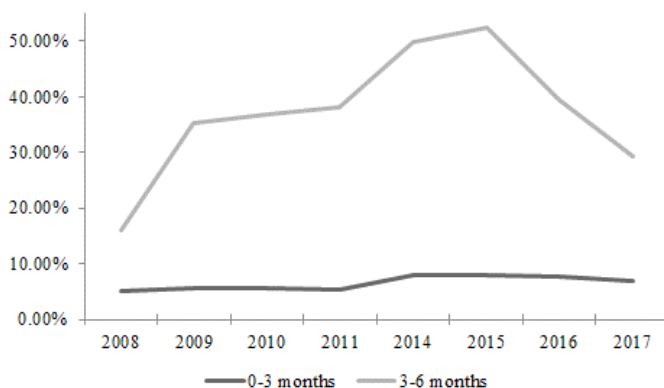
Source: Statistical Office of the Slovak Republic, Office of Labor, Social Affairs and Family of the Slovak Republic, own processing.

4 Conclusion

Analyses show that the unemployment of graduates with higher education in Slovak Republic can be considered as short-term and from the point of view of economic theory as frictional unemployment. In 2008-2017, only a minimum share of university graduates (0.83%), in the case of agricultural sciences only 2.30% of graduates, are registered as jobseekers for more than 12 months. Universities which providing education primarily in the field of agriculture do not create

a separate cluster when examining the structure of job seekers, that creation of which would indicate the existence of a factor causing an increase of the number of unemployed graduates from this field of study. On the contrary, the results of the cluster analysis showed that in the conditions of Slovak Republic it is possible to monitor, in the condition of universities from the perspective of structure of graduates that some of universities obtaining the status "local" universities.

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NEUROPSYCHOLOGY IN NEUROMARKETING SERVICES

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Abstract

The emerging discipline of neuromarketing employs methods originally used in brain research and neuropsychology for investigating economic problems. Neuromarketing or consumer neuroscience addresses marketing relevant problems with methods and insights from brain research. With the help of advanced techniques of imaging, which are applied in the field of consumer neuroscience provides a more direct view into the human. The study contains overview of the origin and development of neuropsychology and neuromarketing, list of relevant sources in neuropsychology and describes selected influential authors and findings in neuromarketing. In the study is neuropsychology seen as the theoretical basis for neuromarketing research.

Keywords: *neuropsychology, gestalt psychology, cognitive psychology, neuromarketing*

JEL classification: *M3, I2, I3*

1   Introduction

In the last years interest in applying neuroscientific findings and methodology to other disciplines and fields of science has been raising and examples of such disciplines are also neuropsychology and neuromarketing.

Neuropsychology is generally defined as a science that explores the relationship between brain and behaviour. It is a psychological scientific discipline which, based on its own knowledge and experiments, as well as the theoretical origins of other human sciences, explains the rules of the dialectical relationship between psychic phenomena and neurophysiological, neuropathological patterns.

Neuropsychology, in addition to the previous monistic (materialist) approach to the identity of man expressed in psychophysiology, and the later dualistic (idealistic) hypothesis of interaction expressed by psychosomatics, holds a specific definition of the connection of the psyche with the nerve processes and the qualitative distance from the physical processes (Benesch, 2001).

1.1   Brief history and origin of neuropsychology

The gradual development of psychology and other neuroscience areas contributed to formation of neuropsychology. Sciences that have made a major contribution to its development include behavioural neurology, cognitive neuroscience, neuroanatomy, neuroengineering, neuroinformatics, neurolinguistics, neurology, psychiatry, neuroecomonies, social neurosciences etc. Its´ research approaches have influenced several psychological directions such as behaviourism, Gestalt psychology, or cognitivism.

Experts have consistently emphasized the need to go beyond the boundaries of behaviourism and explore topics that cannot be explained by conditionality alone, as well as to develop methods that would not only deal with the experimental manipulation of environmental influences. The greatest critic of behavioural psychology was gestalt (shape) psychology and later cognitive psychology.

Gestalt psychology was a response to early behavioural tendencies to interpret behaviour based on conditionality as well as the structuralist tendency to decompose mental processes into basic feelings. According to Gestalt psychology, we can best understand the psychological phenomena if we perceive them as ordered entities and not break into parts. The influence of Gestalt psychology was most evident in the field of shape and sight research. (Sternberg, 2002).

Cognitive psychology, which originated partly from neobehaviorism and partly by defining itself against behaviourism, describes the human mind as a system of information processing (Kučera, 2013). Its goal is to explore the mind compared to computer information processing, while there arise testable models. The cognitive approach has been a great achievement and still prevails in psychology (Hill, 2004).

2   Data and Methods

The study provides brief theoretical overview of origin and development of neuropsychology as it is the theoretical basis for neuromarketing. The study processing was based on the theoretical text analysis. Main focus is on descriptions of relation between neuropsychology and neuromarketing and brief outline of the

techniques and methodologies development used in both sciences. Overview of the most influential scientific journals aimed at neuropsychology is also a part of the study.

3   Results and Discussion

The following list of important **stages in neuropsychological research**, as well as the names of the influential neuropsychology researchers, were described according to Kulišťák (2001). Kulišťák (2001) states that we could even track non-scientific neuropsychological experiments since the fourth millennium, when Sumerian doctors watched the influence of opium in the poppy on the euphoric expressions of addicted individuals. The academic period has been described since the end of the 19th century. The term neuropsychology was used by William Osler for the first time in 1913. The first researches were concerned mainly about the anatomical differentiation of fine cortical structures in the brains of animals and humans (Brodmann, Flechsig, Meynert) and surgical removal of particular parts of the brain (Ferrier, Fritsch, Hitzig, Munk). Later, brain damages were localized and researchers monitored corresponding utterances (Bonhoeffer, Broca, Gudden, Jackson, Liepman, Wernicke, Wilbrand). Psychological experiments in the area of thinking, perception, or memory (Binet, Henri, Ebinghaus, Fechner, Stern, Wundt) have gradually begun to emerge. Research continued on the exact location of function in the brain structure (Flourens, Goltze, von Monakow, Goldstain, Lashley). Differential neuropsychology was also important for the gradual development of clinical neuropsychology (Binet, Henri, Stern) and the creation and production of psychological tests (Binet, Simon, Cattel, Galton, Spearman). Research on psychiatry (Kraepelin), experimental pedagogy (Meuman), occupational psychology (Munstenberg) and psychological techniques (Lurija) were also significant. In the period between the two world wars, several investigators devoted attention to the diagnosis and treatment of soldiers who suffered head injuries during the First World War (Popelreuter, Goldstain, Kleist). Other investigations in brain function and brain treatment have coped with an increasing number of issues, such as aphasia and prozopagnosis (Conrad, Bodamer, Faust, Alajouanine, Ombredan, Durand). Just after the Second World War, significant neuropsychological work has been noticed, mainly in England and America. In England it was, for example, work on space processing by the right hemisphere (Zangwill, Paterson), work on the so called "blind vision" (Weiskrantz, Humhrey) or amnestic disorders (Weiskrantz, Warrington). Zangwill founded the Institute of Experimental Psychology at the Oxford University and participated in the formation of the neuropsychological department. In America, were followed the ideas of

experimental psychologists (Hull, Skinner, Watson). Some papers have focused on research on primates (Blum, Clark, Hebb, Riesten, Sperry, Semmes), others on aphasia (Weisenburg, McBride), and another on psychodiagnostics (Helstead, Reitan).

3.1 Overview of neuropsychology after 50ties of 20th century

In the fifties of the 20th century, larger international cooperation began. Most working groups have a direct or indirect connection to Kurt Goldstein, who worked at the National Veterans' Aphasia Center in Framington. His collaborators (Quadfasel, Goodglass, Kaplan) elaborated well-known aphasiological examination of The Boston Diagnostic Aphasia Examination. In 1966, Geschwind- Professor of Neurology founded the Center for Aphasia at the University of Boston. Lukas Teuber initiated the psychological institute at Massachusetts Institute of Technology (MIT) and in 1961 the World Congress in Bon, was dealing with experimental and clinical neuropsychology issues. In the next few years, further work on brain functions related to neurosurgery (Miller, Sperry) was carried out. In 1967, the International Neuropsychological Society was established in the USA, and after nearly ten years the National Academy of Neuropsychology. Over the next ten years, the American Psychological Association has formed its "Division 40" (Division of Clinical Neuropsychology). Works on rehabilitation of brain functions (Finger, Dialler, Ben-Yishay, Goldstain, Prigatano, Brown, and Spivack) appear in this period in America. European development in the following years was influenced mainly by scientists in Germany (Bay, Leischner, Schmieder, Poeck), Austria (Potzl, Hoff, Gloning) and Switzerland (Perret) and they have made significant contributions to the history of neuropsychology.

In Eastern and Central Europe, throughout the era of neuropsychology development, the name of Soviet scientist A. R. Lurija dominated. He was influenced by his teacher ontogenetical psychologist and pedagogue Vygotskij, further by the neurophysiologists (Sechenov, Bechterev, Bernstein, Sokolov, Anochin), by austrian psychologist and neurologist Sigmund Freud and his psychoanalysis as well as Berlin's "gestaltpsychology" had a great influence on his thinking. Lurija participated in the observation of neurosurgical patients, he was dealing with problems of speech, aphasia, memory, neuropsychology of frontal lobes in connection with thinking, social determination of cognitive processes. Lurija also proposed a neuropsychological examination scheme and wrote a basic textbook of neuropsychology. Neuropsychology was developed also by other Russians, respectively Soviet scientists (Tonkonogij, Uznadze, Korsakova, Moskovičjute, Zejgarnik, Simernickaja, Achutina).

In Slovakia and the Czech Republic, the development of neuropsychology was influenced by Lurija thinking. Experts who most contributed to its development in Slovakia are Kondáš, Košč, Jariabková, Mikulajová, Cséfalvay, Kováč. Among the Czech scientists dominate Míka, Jelínková, Švancara, Diamant, Vašina and Langmeier.

A significant shift in neuropsychological research has occurred with the development of research methods. According to Kassin (2007), neuroscientists nowadays most often use four types of projects: clinical case studies, experimental procedures, electrical records and imaging techniques. Among them are modern imaging techniques valuable tool in the research of the relationship between brain and behavior. The use of these devices is also an example of how progress in one area of science is shifting forward through development in another area (Atkinson, 2003).

Neuropsychology is very progressive area of research and also other names of authors can be listed as for example Stránsky, Pagel, Harmony, Choi etc.

Nowadays, many sources for study of Neuropsychology are available. As the research in the field is expanding, also number of books and scientific journals is growing.

In the following tables, we present a basic neuropsychological literature, ranked according to the significance and benefit. Table 2 includes order of neuropsychological journals sorted by the number of subscribers.

Table 1 **List of the most important neuropsychological literature**

1.	Lezak, M.D. (1995): *Neuropsychological assessment* (3rd ed.). New York: Oxford University Press.
2.	Heilman, K.M., Valenstein, E. (eds.) (1993): *Clinical neuropsychology* (3rd ed.). New York: Oxford University Press.
3.	Walsh, K.W. (1994): *Neuropsychology: a clinical approach* (3rd ed.). New York: Churchill-Livingston.
4.	Kolb, B., Whishaw, I.Q. (1996): *Fundamentals of human neuropsychology* (4th ed.). New York: W.H. Freeman.
5.	Filskov, S.B., Boll, T.J. (eds.) (1981/1986): *Handbook of clinical neuropsychology*. Vol. 1 & II. New York: Wiley.
6.	Luria, A.R. (1973): *The working brain: an introduction to neuropsychology*. New York: Basic Books.
7.	Luria, A.R. (1980): *Higher cortical functions in man* (2nd ed.). New York: Basic Books.
8.	Mesulam, M. (ed.) (1985): *Principles of behavioral neurology*. Philadelphia: F.A. Davis.

9.	Grant, I., Adams, K.M. (1986): *Neuropsychological assessment of neuropsychiatric disorders*. New York: Oxford University Press.
10.	Spreen, O., Strauss, E. (1991): *A compendium of neuropsychological tests: administration, norms and commentary*. New York: Oxford University Press.
11.	Levin, H.S., Eisenberg, H.M., Benton, A.L. (eds.) (1989): *Mild head injury*. New York: Oxford University Press.

Source: Ryan &Bohac, 1996.

Table 2 **List of the most widely read neuropsychological journals**

	In year 1996	**In year 1999**
1.	Journal of Clinical and Experimental Neuropsychology	The Clinical Neuropsychologist
2.	The Clinical Neuropsychologist	Archives of Clinical Neuropsychology
3.	Neuropsychology	Journal of International Neuropsycholocal Society
4.	Archives of Clinical Neuropsychology	Neuropsychology
5.	Neuropsychologia	Journal of Clinical and Experimental Neuropsychology
6.	Neurology	Neuropsychology Rewiew
7.	Psychological Assessment	Psychological Assessment
8.	Journal of Head Trauma Rehabilitation	Assessment
9.	Journal of Consulting and Clinical Psychology	Journal of Head Trauma Rehabilitation
10.	Cortex	Applied Neuropsychology
11.	Brain	Developmental Neuropsychology
12.	Neuropsychiatry, Neuropsychology and Behavioral Neurology	Brain Injury

Source: Kulišťák, 2001.

Table 3 shows the latest order of journals according to SCImago Journal Rank (SJR indicator), that is a measure of scientific influence of scholarly journals that accounts for both the number of citations received by a journal and the importance or prestige of the journals where such citations come from in the last three years period. In the last column of the table is shown h index of the journal (journals´ number of articles (h) that have received at least h citations over the whole).

We can deduce that these journals are also the most read among the professionals today.

Table 3 **List of selected neuropsychological journals according to Scimago Rankings in 2016**

Title	SJR	H index
Trends in Cognitive Sciences	7.948	247
Neuroscience and Biobehavioral Reviews	4.520	189
Journal of Memory and Language	4.044	118
Cognitive Psychology	3.380	100
Neuropsychology Review	3.326	74
Learning and Memory	2.008	113
Biological Psychology	1.907	96
Frontiers in Behavioral Neuroscience	1.745	46
Frontiers in Human Neuroscience	1.739	65
Memory and Cognition	1.663	104
Neuropsychology	1.580	107
Psychophysiology	1.540	133
International Journal of Psychophysiology	1.369	101
Journal of Neuropsychology	1.328	26
Quarterly Journal of Experimental Psychology	1.320	53
Brain and Cognition	1.283	103
Child Neuropsychology	1.283	60
Neuropsychobiology	1.055	77
Archives of Clinical Neuropsychology	0.908	79
Developmental Neuropsychology	0.895	81
Journal of Neuroscience, Psychology, and Economics	0.716	17

Source: Scimago Journal, Country Ranks, 2016.

Neuropsychological knowledge is now being used by a growing number of industries. Among modern fields of science, which, in conjunction with practical requirements, builds on neuropsychological findings and increasingly gains its place among neuroscientists, belongs neuromarketing.

3.1 Neuromarketing

Neuromarketing is a modern sector of marketing that seeks to integrate the ever-increasing amount of knowledge about brain activity, and in connection with this insight into consumer behavior and incorporates it into advertising strategies. In contrast with traditional procedures, using questionnaires, street surveys, addressing target groups, etc., neuromarketing has more ambitious goals. Its ambition is to understand not only what we want but also why we want it. Modern research suggests that many of our decisions arise in our minds long before we become aware of them and how they arise and why it is so, it remains largely unthinkable. If the neuromarketing is becoming more and more familiar among so called Neurosciences, it is also because neuromarketing researchers are increasingly exploring brain activity from a variety of neurosciences and even more are using modern instrumentation. Advertisement strategies experts are more and more aware that a sufficiently comprehensive understanding of what motivates our buying behavior and also attracting customers in a fierce competition is no longer possible without the implementation of the latest knowledge of neuroanatomy, neurophysiology, neurotransmitter biochemistry, psychology, and neuropsychology. Similarly, it is no longer possible without the use of medical techniques specifically aimed at the nervous system, electroencephalography, computer tomography, magnetic resonance, functional magnetic resonance, positron emission tomography etc.

When we ask the question of what is now the most commonly used knowledge base in neuromarketing to understand consumer behavior and the subsequent development of technical or tactical strategies, the answer would be probably neuropsychology in synergy with imaging techniques. Evidence of this are the many well-known experiments today.

For example, in 2004, a famous experiment was conducted at Houston Baylor Medical School, which was the beginning of explosive development of neuromarketing. 67 participants drunk Pepsi and Coca - Cola, while scientists were their brain activity using fMRI. Participants first did not know which drink they were drinking and on the next attempt they already had the beverage brand on the cup. In the first part so-called "the blind part" of the experiment, fMRI scans showed higher activity in the ventromedial area of the cerebral cortex, which is considered to be the center of reward, when the participants drank Pepsi. Later, when volunteers knew what they were drinking, brain activity in the hippocampus, middle brain and the Dorsolateral anterior cerebral cortex, which are areas associated with memory and emotional processing, increased their activity when drinking Coca-Cola. That was bad news for Pepsi. Although people liked the taste of the lemonade, the consumers were convinced by the fact that they saw the logo

of their rival. Research has shown that Coca - Cola's preference is more influenced by the brand image than the flavor of its drink.

In another well-known experiment in 2008, a US Frito-Lay potato maker investigated whether people like Cheetos with a flavor of cheese. Brain scans showed that the pattern of brain activity that arose from pleasure was actually caused by an orange powder glue that sticks to the fingers. The company used this fact in TV ads, using Canadian jokes with Cheetos. In 2009, the same company found that glossy packaging with pictures of chips caused a more negative reaction than the matte coating with the picture of potato. Glossy materials activated brain centers responsible for guilt. Subsequently, the company changed the packaging of its products. In 2013, Coca-Cola announced its intention to use neuromarketing to test the effectiveness of its ads, following the success of previous experiments. (Cave, 2015).

4   Conclusion

There is an increasing number of large companies on the market today. With the increasing number of neuromarketing experiments and neuromarketing workplaces, however, new questions arise. Opponents of the use of neurological techniques in marketing warn against customer manipulation and persuading for products. Although the most advanced procedures do not allow "mind reading", understanding some brain activities could lead to abuse of our weaknesses. Ethical dilemmas are exacerbated by use of neuromarketing methods and data, and center on issues of consumer freewill and privacy.

On the other hand, neuromarketing can, for example, help public health awareness campaigns, or help educators teach them to keep students' attention within hours. Richard Glen Boire, director of the Center for Cognitive Freedom and Ethics, thinks that if the methods of neuromarketing become more effective and widely used, we will see products marked with a warning. It could be a small symbol that indicates that neuromarketing has been used when designing a product, as with some products we see a statement that they have not been tested on animals. (Cave, 2015)

Acknowledgements

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INTERNATIONALISMS IN SLOVAK ECONOMICS TERMINOLOGY

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Abstract

The course Language for specific purposes is the pennicle of the foreign language preparation of students of the Slovak University of Agriculture in Nitra. One of the characteristics of a language for specific purposes is a high frequency of international words. Internationalisms occurring in Slovak economic texts are of a different origin, a different degree of inclusion into the Slovak language at the level of pronunciation, spelling, lexicology of the grammar system of categories, etc.

Keywords: *economics terminology, internationalisms, language for specific purpose, process and degree of adaptation*

JEL classification: *A10, Z13*

1   Introduction

The Department of Languages of the Slovak University of Agriculture (later the SUA) in Nitra provides language training for students in six foreign languages - English, French, German, Russian, Slovak and Spanish at different levels from elementary to advanced (at this level it is possible to obtain an international certificate UNIcert II) and the language for specific purposes.

"Obsahové zameranie jednotlivých predmetov vychádza zo Spoločného európskeho referenčného rámca pre jazyky s prihliadnutím na profil študentov SPU."[2] (Holúbeková, Fördösová, 2013, p. 46) The course Language for specific purposes is the pennicle of the foreign language preparation of students of the

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[2]   The content of individual subjects is based on The Common European Framework of Reference for Languages, taking into account the profile of the SUA students. (translated by the authors)

Slovak University of Agriculture in Nitra, so we have focused on the examination of its characteristics.

2   Data and Methods

One of the characteristics of a language for specific purposes is its internationalization and a high frequency of international words which are a subject of our research. This is demonstrated by the fact that in "Výkladový slovník ekonomických pojmov" (Šlosár, Šlosárová, Majtán, 2002) out of 440 terms, there are 150 internationalisms (about 34.3%), while in "Multijazyčný výkladový ekonomický slovník" (Zentková et al., 2016) with 296 entries, we have identified 78 international words, which is about 26.4%.

Our aim is not to provide an exhaustive overview of internationalisms in economic sciences, but to prove an origin and a character of internationalisms on the limited corpus of excerpted lexical units. When examining internationalisms, we have chosen a synchronic approach, complemented, if necessary, by diachronic aspects, especially when examining their origins.

Internationalization and globalization are phenomena that affect all areas of our lives; the Slovak lexicon, mainly Slovak for specific purposes, is no exception. Experts' views on this tendency differ, from the negative ones, which want to protect the Slovak language from any foreign influence at all costs, to those that accept, often uncritically, everything that comes from abroad and explain it as the necessity to adapt to current tendencies in the fear of isolation of the Slovak language and its lagging behind. We think it is necessary to emphasize that a similar situation can be observed in other linguistic sciences, too. Linguistic purification, a protective attitude towards a language, is not observed only in France, where the "Académie française" has been monitoring the purity of the French language since 1635. Its members are constantly following developments, and after every foreign discovery that brings progress as well as new terminology into the French language, they create and offer French users a French equivalent. Although it is obvious that it is the public who decides whether the new equivalent will be accepted and used or they will prefer a foreign expression, often accepted by several other languages, instead. Then, the new expression will be absorbed into the language system and adapted to its laws. "Comité d´étude des termes techniques français" – The Committee for the Study of French Technical Terms, founded in 1954, deals with terminologies. Even in Russian linguistics a group of linguists was formed, who are more or less critical of the internationalization of the Russian language. We can mention N. V. Judina, who says that democratization and liberalization of a society brings vulgarization into the language, which is evident,

among other things, by the contamination of styles. An inappropriate use of internationalisms he named "barbarization" of the Russian language (Judina, 2010, pp. 130-131). In Slovakia, during the 20th century, similar tendencies could be seen; several linguists were in favour of a linguistic purism and held a protective position, although, in 1933, H. Bartek published his idea: "Len národ, ktorý žije úplne oddelene od ostatného sveta, mohol by mať slovník celkom svojský, bez cudzích prvkov. Ale vari na celom svete niet takého národa, čo by sa bol vyvinoval tisícročia v izolácii." (Bartek, 1933, s. 178)[3] The Slovak language has not been developing in the vacuum, new terms and items from foreign countries, and consequently their names keep entering our language.

The first condition for examining expressions of internationalization in the terminology of economic sciences is to define the term internationalism in the field of linguistics. Our study is based mainly on works of important contemporary Slovak linguists. There are several definitions of internationalisms in the Slovak codification manuals and in the professional linguistic literature; all of them are alike:

"Encyklopédia jazykovedy" – international words, internationalisms, foreign words – words of predominantly Gr.-Lat. origin, used in a number of related and unrelated languages, that indicate phenomena of an international character from the fields of politics, philosophy, culture, science, technology, art, sports, etc., and are predominantly terminological. (Mistrík, 1993, p. 196)

"Lingvistický slovník" – internationalisms are foreign words mostly of Greek and Latin origin, which occur in a number of (at least 3) different languages and name phenomena from politics, culture, science, philosophy, technology, etc. (Mistrík, 2002, p. 77)

"Krátky slovník slovenského jazyka" – a foreign word used in a number of related and unrelated languages usually originating in Gr.-Lat. (Doruľa et al., 2003, p. 223)

"Slovník cudzích slov (academic)" – a word, an expression used in a number of unrelated languages of a particular cultural area, either transnational or characteristic for a particular place or artificially created, mainly of Greek and Lat. origin; an international word. (Balážová, Bosák, 2005, p. 440)

"Slovník súčasného slovenského jazyka, H-L" – a foreign word used in several related and unrelated languages that indicates phenomena of an international character (eg. politics, culture, technology); an international word. (Avramovová, Balážová et al., 2011, p. 393)

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3 Only a nation that lives completely separate from the rest of the world could have its own lexicon, free from foreign elements. But around the world there is no such nation that would have developed for thousands of years in isolation. (translated by authors)

These theoretical assumptions and definitions were the basis for formulation of the following criteria for the selection and inclusion of terminological units among internationalisms:

1. The incorporation of the term into terminology in Economics, thus the term has been published in relevant, valid literature considering dictionaries, i.e. in monolingual and multilingual dictionaries of Economics. The possibility to trace the origin of a terminological unit, i.e. what foreign language it expanded and was incorporated into the Slovak language from, as we assume that at present, words from modern languages penetrate among internationalisms.

2. The occurrence of a unit in, at least, three languages that are not related to each other. In our work we consider the Slovak, Czech and Polish languages to be related languages; on the other hand we do not consider Russian to be a related language to them due to a different graphic system. Roman languages - French, Portuguese, Spanish and Italian make the next group. English, German and Hungarian are considered to be specific languages.

3. Based on these criteria, we identified about 250 internationalisms on Economics – microeconomics, macroeconomics, finance, accounting, economic policy, marketing, management. We deliberately have not drawn from primary sources – professional and scientific monographs and papers on Economics in order to eliminate, in our monitored corpus, occasionalisms, and expressions with random or isolated occurrence and words that are used only by one author.

3   Results and Discussion

3.1   Origin of Internationalisms

In the past, Economics terms that gained an international character, were borrowed from classical languages, from Latin (*akcelerácia, akcia, akreditív, aktívum, pasívum, akvizícia, antedatovať, bonifikácia, bonita, bonus, deficit, depresia, dividenda, fiškálny, honorár, inflácia, deflácia kaucia, koncesia, konkurencia, konsolidácia, kooperácia, korporácia, kvartál, likvidita, migrácia, patent, prémia, produkcia, prolongácia, remitent, stimul, subvencia*), in the smaller amount from Greek (*elasticita, logistika, makroekonómia, mikroekonómia, monopol, oligopol, prognóza, stratégia*), also from Italian (*audit, brutto, netto, diskont, indosament, inkaso, kapitál, konto, kredit, portfólio, rabat, saldo, skonto, sortiment, tranzit, valuta*), from French (*anuita, arbitráž, benefit, developer, devíza, fond, franšíza, garant, marža, poste restante, profit, reklama, renta, rentier, tranža)*. Internationalisms of Spanish origin *(embargo)* and Russian origin (*kolchoz, perestrojka)* are rare.

English is currently being promoted as the "lingua franca" the universal language of communication, so most internationalisms are borrowed from English (*bitcoin, brainstorming, broker, damping, koncern, líder, maklér, manažment, sponzor, supermarket, tender atď.*). It is important to keep in mind that more than one half of English lexis is of Latin or French origin. For this reason, we can sometimes find out that some internationalisms borrowed from English actually originated in another language. The following examples demonstrate that English is not the only language that acts as an intermediary; other languages do so, too:

Engl. ← Lat. *broker, shopping, sponzor*
Engl. ← Fr. *benefit, budžet, klíring, kouč, lísing*
Engl. ← It. *manažment*
Fr. ← Lat. *garant, globálny, reklama*
Ger. ← Fr. *kvitancia*
Ger. ← It. *kartel*
Lat. ← Gr. *cyklus, duopol*
It. ← Ger. *banka, bianko*

Some internationalisms have incorporated into the Slovak language to such an extent that a regular user does not even realize that they are not Slovak words but have been borrowed, e.g., *akcia, banka, firma, mena, menový kurz, reklama, šek, štandard, štruktúra, valuta*.

Individual components of multi-word terminological units can be homogeneous or heterogeneous. Homogeneous terminological units come from one language – *akceleračný efekt* (Lat.+Lat.), *emisný kurz* (Lat.+Lat.), *energetický monopol* (Gr.+Gr.), *multiplikačný efekt* (Lat.+Lat.),*poste restante* (Fr.+Fr.), *price taker* (Engl.+Engl.). In our monitored corpus there are more heterogeneous multi-word terms, which combine words from different languages – *aktívne saldo* (Lat.+It.), *bilaterálny monopol* (Lat.+Gr.), *developerská firma*(Fr.+It.), *environmentálna kríza*(Fr.+Gr.), *fiškálna politika* (Lat.+Gr.), *konzervatívny fond*(Lat.+Fr.),*krízový manažment* (Gr.+Engl.), *legislatívna suverenita* (Lat.+Fr.), *monopolistická konkurencia* (Gr.+Lat.), *ratingová agentúra* (Engl.+Fr.) etc.

Table 1 **Prefixes and suffixes**

Affix	Origin	Translation
ko-, kon-	Lat. cum→co-	*koprodukcia, koncentrácia, konsolidácia*
de-	Lat. di	*deflácia, demonopolizácia, devalvácia*
ex-	Lat. ex-	*expanzia, export*
in-	Lat.in-	*insolventnosť*
makro-	Gr. macros	*makroekonómia*

Affix	Origin	Translation
mikro-	Gr. micros	*mikroekonómia*
re-	Lat. re-	*reexport, rekvalifikácia, revalvácia*
-ácia	Lat. (-ationem)	*obligácia, kompenzácia, privatizácia, valorizácia*
-ing	Eng.-ing	*faktoring, revolving, sponzoring*
-ita	Lat. -itatem	*minorita, prosperita, rentabilita*
-izmus	Lat. -ismus	*liberalizmus, monetarizmus*

Source: Authors own results.

A specific part is formed by international affixes that occur in terminologies (of course, with modifications corresponding to the rules of a word formation in individual languages). We can talk about international patterns of terminological units' formation, represented by prefixes and suffixes, for examples see Table 1.

3.2 Adaptation of pronunciation and phonetic integration

The Slovak language borrows new terms from foreign languages, usually with their original pronunciation. If a phonetic system of a source language is compatible with the Slovak language, or if a pronunciation of international terms does not cause any problems to users of the Slovak language, an internationalism is borrowed with its original pronunciation, e.g.: *know-how* [nouhau], *leader* [líder], *trust* [trast], *bitcoin* [bitkoin].

Otherwise, the pronunciation of internationalisms is adapted to the spelling system of the Slovak language. This is especially true if a source language uses a speech sound or a group of speech sounds that do not appear in Slovak. We can demonstrate the pronunciation adjustment process on the term of a French origin *budžet*. SSJ 1959 and VSCS 1997 state the pronunciation [bü-]. Since Slovak does not use the sound of speech [ü], the pronunciation settled on [budžet]. The other term of French origin *poste restante* is presented in dictionaries with a double pronunciation, both, respecting the rule that the final -e is not pronounced [post restant] and the pronunciation [poste restante].

In some cases, the integration refers to entire groups of terms with common elements, for example the original pronunciation of internationalisms of an English origin with suffix -ing [iŋ] has been adapted to [-ing] – *damping, holding, lízing, marketing.*

In some cases, the pronunciation of internationalism suggests what language Slovak has borrowed a specific term from. The internationalism *franchising* with the pronunciation [frenčajzing] originated in English, while *franšíza* was

borrowed from French, with spelling "franchise" and pronunciation [franši:z]. This term proves the fact that the oral borrowing preceded the written one

3.3 Adaptation of Spelling

In the Chapter *3.2* we pointed out that when incorporating new terms into a language, pronunciation is generally superior to spelling. In most cases, the Slovak language borrows a term from a foreign language at first completely, with its original spelling and pronunciation. Gradually, in the course of the use of the term, its spelling changes in accordance with the pronunciation; for a certain period of time the use of two written forms is tolerated until finally the spelling corresponding to the pronunciation becomes fixed. Spelling of internationalisms, which entered the Slovak language a while ago, has been adjusted to the rules of the Slovak language, but those that are entering the language today, in many cases, preserve their original spelling.

Frequent spelling changes related to the pronunciation include, for example, marking a prolonged pronunciation of syllables by a diacritic mark of length – *dolár, manažér, maklér, portfólio*, changing the original spelling -s- to -z-, e.g. *burza, lízing, globalizácia, amortizácia*, changing the original spelling -c- to -k-, e.g. *kríza, mikroekómia, faktúra*.

SSJ 1959 and VSSJ 1997 present the term *dumping* with the original English spelling, drawing attention to the pronunciation damping , KSSJ 2003 only states the spelling *damping* with a notice on the original spelling *dumping*, more recent dictionaries mention both alternatives in order *damping, dumping*, i.e a Slovakized form is preferred. The term *trust*, with this spelling and the English pronunciation trast is presented in SSJ 1964 and VSSJ 1997, later we observe disunity, in SCS 2005 we find a double form *trust, trast*, in KSSJ 2003 and PSP 2013 they are listed in the reverse order *trast, trust*. The international term *e-mail, email, mail, mejl* and its adjective forms *e-mailový, emailový mailový, mejlový* can be found for the first time in KSSJ 2003. Here, and also in other codification manuals, the current standardized Slovak accepts all four variants.

As an example of a final stage of spelling we can mention the internationalism *bilbord*, originally written as a *billboard*; a group of speech sounds -oa-has been simplified to -o-, resulting in the spelling *bilbord*, which is also observed in the derived adjective *bilbordový*. SSJ 1959 presents spelling of the term *klíring* as *clearing* and draws attention to the pronunciation of [klí-], but more resent manuals have dropped using of the vowel group -ea-, which is unusual for Slovak, and have codified the simplified spelling *klíring*, the original English spelling is only highlighted. Terms *líder* and *lízing* act similarly,while a relatively newly-borrowed word *hearing / híring* is provided with two variants, of which the one with

the English spelling has been modified. Groups of letters, which are unusual for Slovak, are also found in the original spelling of the terms *budžet* (Engl. and Fr. budget -dg-), *kouč* (Engl. coach -oa-) a *loby* (Engl. lobby -bb-).

The following terminological units have retained their original spelling, although some of them have been used in Slovak Economics for several decades. The English pronunciation of the term *rating* [rejting] was fixed a long time ago, but officially the spelling with the letter -a- is still the correct one, even in the derived adjective *ratingová agentúra*. Similarly, terminological units *cash flow*[keš flou], *joint venture*[džojnt venčr], *know-how* [nouhau] have retained their original spelling despite of their long use in the Economics terminology. The Slovak spelling „šoping" of the English term *shopping*[šoping] has not been codified, it means it is not correct. On the contrary, the term *brainstorming* [brejnstorming] had not appeared any earlier than in SSSJ A-K 2006, *mailing* even later, in SSSJ M-N 2015, so they are relatively new in Slovak; this is the reason why their spelling has not been adapted yet.

3.4   Lexical-semantic adaptation

Borrowed words, which have been incorporated into another language,   adapt and integrate into the lexicon not only formally but also semantically. Sometimes, in the process of integration, a progressive development and semantic shifts occur; the term may pass from one area of use to another, a completely different one.

The word *tender* is an example**.** According to the SSJ 1964, tender is a a type of railroad car hauled immediately after the locomotive and used to carry fuel and water, the KSSJ 2003 explains the tender as a way in which bodies governed by public law buy what they need for their activities, the SCS 2005 states both meanings plus a legal meaning – public tender.

The term *kouč* can be found in the VSCS 1997, the KSSJ 2003 and the SCS 2005 and indicates a technical advisor and an individual that provides supervision and training to the sports team, originally in the US environment; the SSSJ H-L 2011 states the other meaning of this term, from the field of psychology management, describing a person who develops a human potential, helps his clients advance towards professional growth, optimizes personal growth, and interpersonal and professional communication.

3.5   Grammatical inclusion

Loan words which incorporate into the lexicon of a recipient language, in most cases gradually integrate into its grammatical system, too. This also applies to international words. In Slovak, nouns and adjectives are assigned to a particular

grammatical gender, even in cases where the source language does not preserve gender-specific forms. A consonant at the end of a word is typical for a masculine gender of nouns, with the exception of the suffix -um, which is typical for the neutral gender. This phenomenon is related to the grammatical suffix; in Slovak the suffix -a- is typical for feminine gender of nouns, so internationalisms preserve the suffix -a- in feminine: Fr. "la franchise" – *franšíza*, "la marge" – *marža*, Engl. logistics – *logistika*. Consequently, they obtain a more or less complete paradigm in accordance with the grammar rules of the Slovak language. Masculine nouns ending in hard or neutral consonant are declined like "dub", feminine nouns ending in a soft consonant +a, possibly -ia are declined like "ulica", or the last letter -a being preceded by a hard consonant, is declined like "žena". Adjectives with the suffix -ý/-y in the musculine gender are considered to be adjectives with hard ending, being declined like "pekný", in feminine they take the ending -á/-a, in neuter -é/-e. International verbs, there are only a few of them, take a grammatical category of aspect – perfective or imperfective aspect.

The vast majority of internationalisms are gradually being incorporated into the grammatical-morphological system of the Slovak language. In some cases, this process is slow, but for example, neologism *bitcoin* is already declined like "dub" although it is still not a part of any Slovak dictionaries or dictionaries of Economics. The term *mailing* was spotted in the SSSJ 2015, but was included amongst terms ending in suffix -ing (*klíring, damping, rating*), that had occurred in the Slovak language in the past, so it already has a declension paradigm. There are a few internationalisms that have retained their original attributes, for example they are indeclinable as nouns Engl. *cash flow, know-how, loby,* Fr. *poste restante,* or an adjective It. *bianko / bianco (šek).*

4   Conclusion

Vocabulary of every language is developing, constantly undergoing changes as a result of evolutionary changes in the society and a technological progress. "A continuous development in the society leads to the demand for new methods and approaches as well as to the need to designate precisely new objects and concepts of extra linguistic reality." (Klimentová, 2016, p. 115) New facts and inventions bring new names, and they together penetrate into the lexicon of languages of countries that see these changes. "Je jasná vec, že s novými pojmami alebo vecami dostávajú sa do reči aj nové slová, a to zvyčajne z toho jazyka, z ktorého sme prijali novú vec alebo pojem." (Bartek, 1933, p. 178)[4] This phenomenon can

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[4]   It is clear that as life brings new items or concepts, they enter a language together with new words, usually from the language we have adopted a new thing or a concept from. (translated by authors)

be also observed in the terminology of Economics, which we excerpted from secondary sources – monolingual and multilingual dictionaries of Economics.

The aim of the paper was to provide an analytical view of the origin, occurrence, structure and a character of international words in the Slovak language, and to indicate trends in terminology in Economics using various scientific and research methods with the use of synchronic and diachronic approach and a qualitative evaluation. Numerous examples have demonstrated how international words are incorporated into the Slovak Economics terminology and how the process of their adaptation and integration takes its course.

In this context, we can say that Slovak terminology in Economics is not likely to increase the saturation of internationalisms compared to the previous periods, but their character differs from those that had penetrated into the language earlier. Especially newer internationalisms of English origin are perceived as foreign elements because they come from a very different lexical-semantic, grammar and orthoepic system. We do not have to defend the internationalization of the Slovak language, especially the terminology of various disciplines; Slovak is sufficiently established and rich language, so internationalization cannot threaten it. However, in Slovakia, we consider it appropriate for professionals, linguists and economists to monitor and guide the development of professional lexis, as watching Slovak public television or radio should not require too frequent use of a dictionary of foreign words. Even experts should not artificially "raise" the level of their scientific papers by an excessive use of foreign words, despite the fact that scientific articles and monographs are primarily intended for their learned colleagues who understand these expressions.

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Abbreviations

Engl. English
Fr. French

Ger. German
Gr. Greek
ind. indeclinable
inv. invariable
It. Italian
KSSJ Krátky slovník slovenského jazyka / Short Dictionary of the Slovak Language
Lat. Latin
Pol. Polish
Port. Portuguese
PSP Pravidlá slovenského pravopisu / Rules of Slovak Spelling
Rus. Russian
SCS Slovník cudzích slov /
SSJ Dictionary of the Slovak language
SSSJ Slovník súčasného slovenského jazyka / Dictionary of Contemporary Slovak Language
Sp. Spanish
VSCS Veľký slovník cudzích slov / Great Dictionary of Foreign Words

THE QUALITY ASSURANCE SYSTEM OF EDUCATION AS A FACTOR OF AGRICULTURE SUSTAINABLE DEVELOPMENT

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Abstract

The main objective of creating conditions for sustainable development of rural areas is the formation of professional staff capable of developing and implementing effective management decisions. The development of agriculture requires a rational approach to the use of all types of productive resources, taking into account environmental aspects, achieving the fullest possible employment of the rural population. To solve these problems it is necessary to attract highly qualified specialists. They should have the complex of theoretical and practical skills, knowledge and abilities. Agricultural producers must be confident in the high level of graduates of higher educational establishments of agrarian profile coming to work for them. To ensure a balance between the demands of employers for graduates and state standards allows the system of public accreditation of educational agricultural programs. The aim of the study is to determine the development of common requirements for the training of specialists of higher education engaged in agriculture. For it 95 employers, who are leaders of different levels in the agro-industrial complex, were interviewed in 10 regions of Russia and Belarus by survey and interviewing methods. Production standards benchmarks for the evaluation of the education quality is implemented in the framework of mathematical models based on statistical data. The agribusiness entities have given database for modeling through the peer review, the results of mathematical calculations underlying the determination of professional

competences of future specialists. The results of the research are the basis of the na-tional Agency for Accreditation of Agricultural Programs activities, created with the participation of the authors.

Keywords: *education quality, sustainable development, agriculture, modelling*

JEL classification: *A20, Q01*

1   Introduction

Stable socio – economic development of rural areas, increasing the volume of agricultural production and its efficiency, achieving full employment of the rural population, rational use of land-all these tasks are to increase the sustainability of rural development. The creation of socio-economic conditions for the sustainable development of rural areas is impossible without the availability of qualified specialists in the field of agriculture. The graduate must demonstrate special competencies related to the uniqueness of the tasks of agriculture, objects and types of innovative engineering activities in the field of agricultural specialization (research, production and technological, organizational and managerial, design, etc.) in agricultural enterprises and organizations for servicing agricultural production, and the readiness to follow its corporate culture. Competence is the amount of qualifications, which are defined by asset of knowledge, skills and proficiency (Figure 1).

Figure 1 **The scheme of professional competences (Golokhvastov et al., 2015a)**
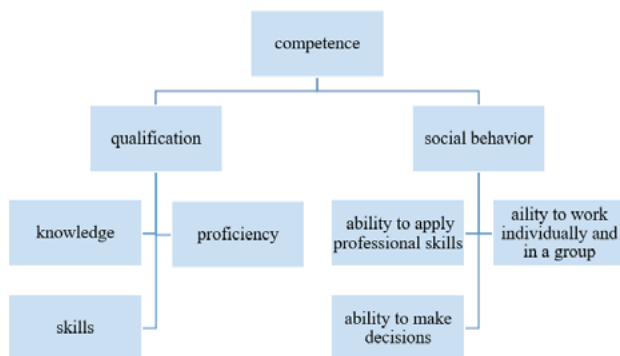
The graduate must have experience in the use of universal methods of engineering analysis, intellectual technologies and methods of computer analysis in solving complex and special engineering problems of the agrarian profile to form the competences at the appropriate level.

Efficiency of work of the graduate in agricultural production is determined by compliance of requirements imposed by employers to abilities, competences and skills; successful execution of job responsibilities; psychological compliance of a post and adaptation in new collective; personal characteristics. Selection of applicants for the position is based on the following factors: theoretical and practical knowledge, professional and personal qualities, health status, availability of additional professional skills (knowledge of information technology, foreign languages, modern management methods, etc.). (Petropavlovskiy, M., Smelik, V., & Nefedova, O., 2016).

2   Data and Methods

Training of a highly qualified specialist takes place through synthesis of requirements of employers, educational structures and public administration bodies to the level of professional competences (Vasilevskaya, E., Maximovich, V. ,2014, Zayceva, 2015). An effective tool for solving this problem is the public accreditation of professional educational programs (PA PEP), which is recognition of the quality and level of training of graduates who have mastered the educational program in a particular organization. This organization carries out educational activity which meets requirements of professional standards and labor market to specialists of the corresponding profile.

The purpose of public accreditation is to give an independent objective assessment of the quality of training of graduates on the accredited educational program on the basis of indicators that are not taken into account in the state accreditation. These indicators are based on the analysis of the demand for graduates by the labor market, compliance of their qualifications with the requirements of employers, professional standards, as well as identifying the best practices and significant achievements of the educational institution.

Guided by the requirements of the Federal State Education Standards in the training of future professionals, universities determine a set of core competencies (professional and general cultural). A graduate should have its competencies as a result of the successful study of educational programs in the field of agricultural machinery and agricultural technologies. However, without taking into account the opinion of employers, it is impossible to form an accurate list of competencies.

In the framework of the International TEMPUS project "Development of public accreditation of agricultural programs in Russian" (PACAgro) a survey was conducted of **95 employers** of graduates of agricultural universities in **10 regions of Russia and one from Belarus** in different fields of activity, see Figure 2 (Golokhvastov et al., 2015a). The research methods are survey and interviewing.

Figure 2 **Distribution of respondents by area of job (Golokhvastov et al., 2015b)**
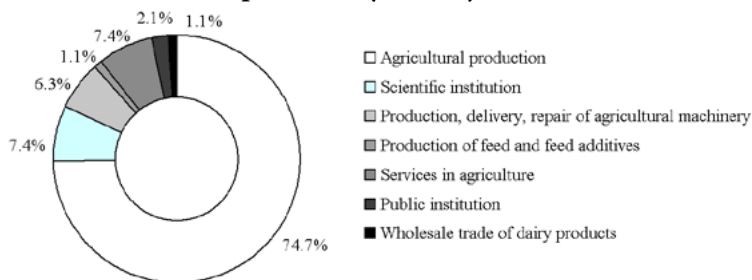
In assessing the practical skills of graduates of agricultural Universities were given **419 answers**; most often were assessed the qualifications of a mechanical engineer and agronomist (agronomy) – 13.6%, the zooengineer - 12.4% and a veterinarian is 12.2%.

The survey revealed that some qualifications do not exist the following theoretical and practical knowledge and skills:
- "agronomy", "scientist agronomist" - lack of practical experience in modern agricultural enterprises, poor knowledge of a foreign language;
- "zooengineer", "veterinarian" - graduates are not prepared to work with large animals, there is no knowledge of a foreign language, theoretical knowledge of the main disciplines are at a low level;
- "agroengineering", "mechanical engineer" - insufficient knowledge of production equipment operation;
- "economics", "management", "economist", "accountant" - General theoretical knowledge-at a low level, not enough practical experience of exchange with other agricultural enterprises (Smelik, V., Ovchinnikova, E., 2016).

As a result of the survey, a certain discrepancy between the requirements of employers and the level of preparedness of graduates was revealed. Thus, the average score of the level of formation of professional competencies varies depending on the profession from 4.2 to 4.5 on a five-point scale, almost 30% of employers surveyed note the poor knowledge of graduates of advanced technologies and management practices in agriculture. 57% of respondents believe that the level of theoretical and practical training of graduates has improved over the past 10 years, 27% - has not changed and 15.4% - decreased. Distribution by profession is shown in Figure 3.

The results of the surveys show that agricultural workers are poorly prepared to meet the challenges that contribute to improving the sustainability of rural areas.

The survey was conducted by expert groups, which included representatives of public organizations, employers, universities (teachers students, administrative staff). The received statistical base allows to reveal the most significant competences in the separate directions of preparation and serves as a basis for formation to adequate requirements of the market of educational programs.

Figure 3 **Chart of the training by profession level(Golokhvastov et al., 2015b)**
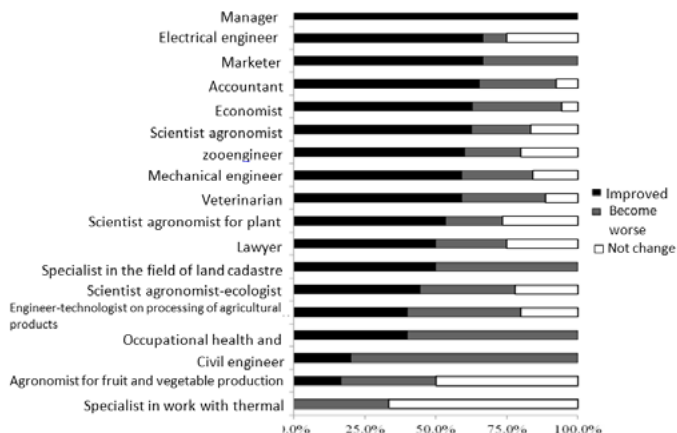
Public accreditation has advantages for both employers and future graduates.

The benefits of PA PEP for graduates:
- confirmation of the high (in some cases international) level of the quality of the program implementation through the introduction of accredited agricultural programs in the register;
- possibility to obtain a certificate for compliance with the qualification requirements and to apply for inclusion in the register of national or international level professional specialists (Smelik, V., & Ovchinnikova, E., 2016).

The benefits of PA PEP for employers:
- obtaining information about universities and educational programs that have successfully passed an independent evaluation for compliance with national and international requirements in terms of quality assurance of education;
- possibility of forming a competence model of the educational program graduate in accordance with agricultural business needs;
- decrease of financial costs for training and retraining;
- participation in the preparation of the state order for the specialists training with the necessary qualifications for agriculture.

3   Results and Discussion

Public Accreditation as part of the education quality assurance system allows for a more detailed approach to the development of educational programs. First of all, it is necessary to form a list of competencies, the receipt of which will meet both the requirements of public authorities and the needs of agro-industrial enterprises (Golokhvastov et al., 2015b; Perekopskii et al., 2016). Implementation of professional and public accreditation procedures allows planning the development of skills and abilities necessary for specialists of the agro-industrial complex to solve the problems of increasing the stability of rural areas.The process of training specialists takes four (six) years, the list of formed competencies should be constantly subjected to iterative shifts with the help of expert evaluation methods and principles of extrapolation of data.

The mathematical expression of this process is the construction of an additive model for each direction of training and each year of training. It allows you to build quality trends used in the creation of educational training programs.

$$\sum_{i=1}^{n}\sum_{j=1}^{m} X_i Y_j \ (1),$$

where

$$\sum_{i=1}^{n} X_i \ –$$

– the sum generated educational program competencies,

$$\sum_{j=1}^{m} Y_j \ –$$

– the sum of the weight of each competence in the educational program, determined on a scale of ten. Weight accounting is necessary to determine the proportion of subjects in the educational program, forming a specific competence.

The results of mathematical calculations are the basis for planning the activities of the National Agency for Professional Accreditation of Educational Programs, created within the TEMPUS project with the participation of the authors.

4   Conclusion

The regularity of the choice of certain competencies is possible only after a graduate of the University can take a direct p art in the production process for a particular employer.

Then it will be possible to identify the level of competencies formation needed to improve the stability of rural areas. These competencies include the ability:

- to independently find organizational and managerial solutions aimed at improving the socio-economic efficiency of agriculture, and willingness to bear responsibility for them;
- to develop and implement new technical, economic and technological solutions;
- to optimize technical processes through the use of modern information technologies and mathematical models.

Total 95 employers from 10 regions of Russia and Belarus were interviewed as part of the study. Based on the results of the surveys, mathematical dependencies were developed, aimed at the formation of new approaches to the development of educational programs in agriculture. The results of the research are the basis for the organization of the National Agency for Accreditation of Educational Programs of Agricultural Profile activities.

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PLACE AND TASKS OF ETHICS IN HUMANIZATION OF ECONOMICS

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Abstract

Global economy enables reorganization of production in the global scale with regards to using opportunities to reach the highest profit. A global change comes of economic and social environment, thanks to the development, in which there are problems, risks and threats of a global nature. In such connections, there is an active call for humanization of economics in which the social and human sciences shall take part. Concerning this task should Ethics, as one of these sciences, take part in rehabilitation of an original and essential task of economics – a service for life. At the same time, it should explicate the reasons of accepting moral norms by economic subjects with the aim to strengthen their responsibility not only for a successful development of global economy but also for the quality life on the Earth. Except of the global ethics these tasks are topical also for such applied ethics such as entrepreneurial ethics, environmental ethics, managerial ethics, marketing ethics, etc. and these should be known to all the subjects which are somehow engaged in economics.

Key words: *economics, social and human sciences, ethics, humanization, responsibility*

JEL classification: *A12, A20, E71,I25, O15*

1   Introduction

Global economy enables reorganization of the production in the global scale with regards to using opportunities in order to reach the highest profit. It obviously obtains significantly higher economic effect regarding the use of productive factors and higher quality level of economic growth of services and products. At the same time, it is connected with the polarization of the richness in the world as well as

the various types of inequalities, problems, risks or threats in the world having the global character. This is not an issue of the less developed countries but all the countries, their citizens and, nevertheless, also the nature (see also Mravcová, 2016). They create the reversed side of the global economy such as the whole globalization process reflected by several scientific disciplines.

As it is stated: „In the last years the globalization tendencies have become more often multidisciplinary processes." (Jemala, 2008, p. 933) However, these processes have already reached over political, business, financial or technological connections and, therefore, they demand particular environmental, social or multicultural solutions of problems of the global world (Ibid.).

As for example, it is possible to look at the development of global economy or its reversed face from several scientific disciplines containing social sciences and humanities. These take an important place in the humanization of economy, i.e. in its restructuralization so that it can enable the inhabitants of the Earth to work on development and sustainability in the highest possible rate. Indeed, today some economists state that the need of humanities and social exploration has been extremely asked for (Staněk, Ivanová, 2015). They point at the non-substitutable role of social sciences and humanities with regards to revealing causal connections so "that it would be possible to predict the future development and deal with the predicted estimation of the future development." (Pauhofová, Staněk, Volner, 2013) They confirm that these facts have become these days the presupposition in all the fields of humanities and social science (Ibid.).

As for illustration, the pedagogue J. Hábl analyses and identifies the causes of the modern crises of humanism, and states that in spite of the development in the fields of scientific and technological knowledge enabling well-being mainly in the western countries, the humanism falls behind and, moreover, it is in crisis. The culture of abundance and prosperity sharply contrasts the poverty of millions of the hungry, needy, illiterate people or nations which cannot be helped by the "civilized world". He mentions a number of dehumanizing effects such as dehumanization, individualization, carelessness or impersonalization of interpersonal relations. Hábl also clarifies that also pedagogy as one of the social sciences is interested in the humanization and personalization of economy (Hábl, 2010).

Ethics as one of the humanities points at the need of humanization of economy, rehabilitation of its original and essential role – the role for life[5]. From its point of view it critically judges and comments the situation in a new global

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[5] Rich focuses social and ethical point of view on economy and emphasizes the fact that the essential reason of economy is the service to life. Its task is to fulfil man in a humanized way by necessary goods, fulfil his needs and moreover he points at the fact that the quality of life cannot be judged only via economic indicators (Rich, 1994).

environment. Automatically, it is no more valid that the „Economic growth is also human development." (Rahman, Banerjee, 2015)

2   Data and Methods

Regarding the worrying situation in new global environment in which global economy takes its reasonable part, the paper justifies the need to humanize economics through humanities and social science. Ethics[6], on which the paper focuses, also belongs there as one of the humanities.

From the ethical point of view, it is necessary to look at the whole process of globalization and thus also to formation and functioning of global economics and at the same time, to evaluate critically also its part in global problems, risks and threats presenting its "reversed face". In such a connection the ethics points at the need to humanize economics in a new global environment requiring restructuralising the global economy in a way that it focuses not only on the economic growth but also increase in quality of life on the Earth and sustainable development of economy and society. First of all, it requires giving back the original and basic task of economy – its service to life and also point at other tasks in society and also responsibly considers consequences bringing its functioning. Humanization of economy is a long and difficult process which should be attempted by philosophically conceived economic science.

At the same time, humanization of economics becomes the task for professionals in academic environment. It requires the attention of political and economic subjects and institutions in the world as well as the attention of educational systems and institutions. They can take a bigger part in preparation of human sources which should enter economics as responsible subjects attempting to reach the economic development to be connected with the social development in all parts of the world so that Man and nature will not suffer. Due to the fact that humanistic tendencies are necessary to be perceived in a society in a dialogue, in this connection it is required to join the humanization of economics with humanization of education and explicate the place and task of ethics and other social sciences and humanities in the preparation of human sources for the global economy. Yet, J.A. Komensky in his times talked about the expressions of dehumanization, cruelties, life damaging, the principle of human and social function of science and school as a place of humanism, life-long education of all the people in

[6] Ethics takes part in humanities which are according to OECD the sixth from the basic six groups of scientific and technological fields. This division was taken also to the current Slovak legislation correcting the field of the state support of science and development (Humanitné vedy. Centrálny informačný portál pre vedu, výskum a a inovácie (MŠV a V a Š SR).

everything which is essential for life (Čapková, et.al., 1991). The first task of such places should be cultivation of negative attempts of human potential.

3 Calls for humanization of economics in new global environment

The process of the world economy globalization creates the new reality of the world economy. It is the basic phenomenon of the current development of the world economy; it forms a new global economic and social environment which presents qualitatively a new level of internationalization of economic life. In spite of the fact that the global economy is connected with the rise of globalizing circles of production and accumulation, with the rise of transnational capital, business development, spread of entrepreneurial investments, finance, production, sale or information through national borders or the growth of international labour division. At the same time, it is connected with several ailments, the growth of economic and social misbalance, problems, risks and threats in the global dimension.

In the result of its development we note serious shakes of social structures and negative influences on social, cultural, ecological and other conditions in which today people live. As for example, due to developing global competition which essentially differs from the model of so-called perfect competition, there comes the spread of massive and diverse offer of products regardless the real needs of people and thus also to spread of mass consumption That is the expression of overwhelming paradigm of anthropocentrism and the big social and cultural burden of nature is connected with it. Despite of that, the grey and black economy is developed, the growth or inequality in the world becomes which is connected with the different quality of life on the Earth, there is also illiteracy, problems of unavailability of medical care, security, and inequality regarding the division of natural sources, etc.

The stated negative influences and many other "ailments" in a new global environment present the "reversed side" of the global economics pointing at the fact that this economy got to the level of recessions and in the name of development or rising the quality of life and the hole society there is the need for its reformation – humanization. We can agree with the opinion that „humanization should become the catalyser of economic changes in the 21st century but also the changes of the whole picture of society. The process of humanization of economics and society should "catalyse" the whole global development and eliminate its negative sides and direct towards the bigger quality of life. It should be the immanent element of activities of people, the key part of entrepreneurial subjects and at the same time the key factor of activity of societies and states (Ivanová, 2013).Eventually, the

need for humanization is considered in all the fields of life. Humanization is one way for seeking the answers and outcomes from situations in which the current society is. It is considered to be a catalyser of social and economic problems and changes in the 21st century (Ibid.).

As it is stated, humanization of economics presents an attempt of reformation of economics, globalization and social injustice. It searches for the reasons by which organization changes lives and communities in the world by creating the models of economic and social development which can offer more fair and human future (Restakis, 2010).

Nowadays, the concept of "humanistic economy "which is according to professor Haluška an alternative to the current way of functioning of economy and at the same time it is the hope for correction he defects floating on the surface of the current economic crisis. As he states – the concept "humanistic economy"presents the whole concept of humanization and also the democratization of economy (Haluška, 2014). A key and the essence of functioning of the fair economy, the fair relation between the input of creative work and the rate of effectiveness which can be used by an individual, his family, community and bigger social groups. Humanistic economy leans over such notions such as – effectiveness, fairness, democratic, human future but also responsibility, higher quality of life on the Earth, etc., which are included in the dictionary of ethics. In such economy the dominant becomes the human factor, productive factor, and the man – creator who has given the name also to this new era of market economy (Haluška, 2011). As it is stated: "Humanism is a rare commodity. The more aware of its insufficiency we are, the more valuable it becomes." (Hábl, 2010) This „commodity" is primarily the notion operated by social sciences and humanities with the ethics in the centre (see more in Lutz, Lux, 1979, 1988; Giovanolla, B. 2009; González, A.M., 2014; Martins, A. Martins, I. and Pereira, O., 2018). The place of ethics and also other humanities and social sciences is thus in humanization of economics indubitable.

4 Place and tasks of social sciences and humanities and especially Ethics in humanization of economy

Social sciences and humanities to which ethics belongs, are the part of culture in every society but also despite of that, there are the opinions in the current worlds about their ineffectiveness, unproductivity and also in utility. It is caused by the

current paradigm dominating in education which is "education for profit" [7], which does not bring the higher level of education in the society. Martha Nussbaum, the author of the book Not for Profit, Why Democracy Needs the Humanities (2010) focuses the critical point of view on the current level of education and education in the world and states that economic changes do not bring by themselves the higher level of education to the society. As for example the achievements in health care and education only weakly correlate with economic growth of the society. In such a correlation it justifies the need to devote its attention to humanities and social sciences which have been gradually disappearing from universities (Nussbaum, 2010). The reason is their unusefulness for economic profit. The paradigm "education for profit" which is criticized by Martha Nussbaum does not show as the right one regarding the negative influences of economics towards social, cultural, ecological and other conditions in a new global environment where people live. It is not correct to determine just the functioning of global economy, increase in economic growth and other positive indicators without remembering the consequences of these processes on life of inhabitants or nature.

Within these connections we are aiming at the social sciences and humanities which should primarily reflect the situation in a new global environment from their points of views, evaluate it with the help of their methods enabling them reveal social, cultural, environmental phenomena, states, processes, or relations. At the same time, it enables them reveal the "reversed side" of global economy and then, from their points of view, judge to what extent the economy satisfies the needs of current people, develops the life on the Earth and provides sustainable development. Consequently, regarding the fact of explanation of problems and insufficiencies, their task is to suggest the procedures form their points of view of how to humanize economy and at the same time to contribute towards humanization of the society. We think that among social sciences and humanities ethics takes an important place in humanization of economics.

4.1   Ethics and Humanization of Economics

Humanization of economics is considered as a social process in which the moral process in economics and society, an effective and long-term economic and social development is supported, and the centre of attention is not the run for profit but man and society as a unity. We can agree with an opinion that: "Necessity of

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[7]   Matha C. Nussbaum in the book *Not for profit: Why democracy needs humanities,* which is required for the current philosophy of education, criticizes education „for profit" limited for three basic skills: reading, writing and counting. Thinking (political, social and environmental) is considered to be pointless and becomes an obstacle of economic growth (Nussbaum, 2010).

respecting ethic aspects of economic activities go hand in hand with globalization process". (Džbánková, Sirúček, 2007) Ethics focuses its attention to these aspects and interprets and evaluates activities and aims by its own language as well as their consequences. At the same time, it points out the causes in global economy or reasons of moral failures of particular economic subjects within this global system and focuses on the values which should be respected and followed.

Considering the fact that the essential function of ethics lies in regulation of actions of social subjects with regard to other social subjects as well as to acting subject, ethics should explain the need to accept moral norms in economic activities. Apart from that, it should strengthen moral consciousness mainly of the capital owners, managers managing social processes, entrepreneurs but also other subjects in global environment. At the same time, it should strengthen their responsibility not only for successful development of global economy but also for negative phenomena, processes which go hand in hand with this development.

The current ethics could contribute towards humanization thanks to its prescriptive language of economy and also drafts procedures and aims which will be in favour of direct and indirect participants of entrepreneurship, and at the same time they will threaten environment and nature in the lowest possible rate.

5 Discussion and Results

As we consider humanization of economics in the current new global environment, apart from the social ethics also global ethics[8] has its important role focusing on ethical issues coming from the global interconnection of the world population through theoretical investigation (Hutchings, 2010). Eventually, it started to be formed in the time when not only global economic problems started to appear as well as ecological, environmental and social among which belong poverty in the world, climate changes, breaking international justice, regulation of global business, threats from depletion of natural sources, fears from terrorism, etc. Global ethics requires a common approach towards binding values, guiding principles, and personal attitudes towards cultures, religions, political and economic systems and ideologies. K. Hutchings clarifies it as a field which covers the international sphere as one dimension of globalizing social, political and economic relations. It concerns relations among collective agents (states, cultures, etc.) as well as the relations between groups and individuals and relations between individuals. It pays attention to moral questions regarding war and peace, global political community,

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[8] gulation to so-called global ethics has also been the part of UNESCO solution, global commission for culture and development. In 1995 it was presented in the report Our Creative Diversity. (UNESCO. 1995. World Commission on Culture and Development, *Our creative diversity*)

different opinions on values arising within conditions of globalization, focuses its attention also to moral relevant agents in global environment and their identities or binds of particular social subjects to each other (Hutchings, 2010).

As P. Singer notes in the book *Jeden svet (One world)* with the subtitle *Etika globalizácie – Ethics of Globalization (2006),* it is necessary for the leaders of our countries to look at globalization from the moral point of view. It pays attention mainly to global connections of ethics and politics, ethics and economics, cultural imperialism and relativism. It critically points at the task of the global powers in relation to environment, poverty growth in the world, and in connection with activities of multinational companies stating that: „The question of morality is particularly in case of multinational companies which conclude agreements with governments of developing countries in order to get crude-oil, natural minerals or wood, fishing or building big hotels and touristic centres." (Singer, 2006) Singer pays attention to a situation in a new global economic and social environment mainly in the chapter: One economy[9] focusing mainly on economic interests of the worlds organizations, mainly of the World Trade Organization. He argues that if there is any organisation which should be pointed at by the critics of globalization due to the fact that it is responsible for the pressure on the process of globalization going the wrong direction that should be WTO (Ibid.).

H. Küng as a contribution for global ethics states that the global market undoubtedly needs the world ethos. That should be accepted by all the economic and entrepreneurial subjects connected to it because apart from other forms of regulation they are touched by moral regulation leaning over the highest human point of view (Küng, 2000).

Business Ethics reflects a reversed side of global economics and situation in new global economic and social environment as one of the applied ethics. A key task of applied ethics is to know how to implement ethics into practice. That means a skill to reflect and point at actual problems relevant for ethics and society, create culture of a dialogue and support mechanisms and instruments in practice. At the same time, it should clarify, justify, suggest moral presuppositions of fair, justified and competent decisions (Klimková, 2016).

Nowadays, professionals from the field of philosophy, ethics but also economists and experts from other fields have focused on Business Ethics that points out irresponsible behaviour (destabilized market, damaging subjects taking part into business making, as well as environment and nature) which should be avoided by subjects realizing economic activities in new global environment. Their moral obligation is to adapt to new conditions of a global market and strive for

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[9]   From the book*: Singer, P. Jeden svet. Etika globalizácie.2006.*

the profit by their socially responsible actions and take part in creation of favourable conditions for the quality life of inhabitants on this planet (Svitačová, Hrehová, 2016). One of the actual task of Business Ethics as well as Economic Ethics (a scope of which is wider than the notion of Business Ethics not relating only to ethic activities in business but investigating ethic infrastructure of market, moral aspects of activities in all the fields of economic system, etc.), is to solve ethical questions and issues arising in new global environment. In this regard it is necessary to point out the fact that some economists realize causes and consequences of immoral activities connected with the development of global economy. As for example, regarding the income polarization it is stated that: „Income polarization does not arise only by permanent appreciation of wealth but due to corruption, tax evasion and immoral and unethical acts, there is a disproportionate income polarization (Ivanová, 2013). Moreover, the expansion of these amoralities not only leads to the destruction not only of the economy itself but also of the destruction of social bonds (here). It is not just business ethics that points to the need to accept moral standards in business on the global market, which is also a way to humanize the economy.

Other applied ethics respond to the problems, risks and threats in a new global environment that are more or less related to the development of the global economy. An abiotically oriented economy that promotes the development of consumer globalized culture and has a significant share in the global ontic conflict of culture with nature reflects both environmental philosophy and environmental ethics. One of the issues that they take into consideration is how and if at all it is possible to build sustainable models of such a society that would satisfy people's needs without threatening or restricting the ability of future generations to meet their needs (Palovičová, 2012).

Managerial Ethics[10] focuses on practical activities of managers, evaluating not only fulfilment of managerial functions from the moral point of view but all their actions. Current management ethics assesses realization of manager professional activities in a new global environment from the point of view of ethics. Globally educated and conscious managers are still more expected to lead their actions in economically, socially and environmentally responsible and sustainable way (Mravcová, 2017). As for example, according to F. Cardot, this is a today challenge for not submitting to fear, indifference by respecting economic effects of entrepreneurship and in concordance with the principle of responsibility of global ethics. It should also actively come into the debate of plural society (Cardot, 2006).

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[10] nagerial ethics and Environmental Ethics are considered to be essential ones within Business Ethics. See for example A. Remišová. (2011). *Etika a ekonomika.*

Apart from the global ethics and the applied ethics mentioned above in the text we could also mention other applied ethics calling for responsibility for the means and aims of global economy and the state in which the new global environment currently is. Thus, they can help economists, managers and other professionals, as well as other people to realize the reversed side of global economy and also the need to join the development of global economy with the social development, and well-being of the majority of population also with the sustainable development. Thus, they can help humanize economy.

6   Conclusion

The whole process of globalization, which is formation and functioning of global economy, can be seen from the point of view of ethics. Especially global ethics and some applied ethics not only asses and interpret negative phenomena, processes in new global environment but also suggest and justify moral aims and tasks, the need for fair, responsible and competent decisions for fulfilling tasks in such environment. We consider important for the subjects engaged in economic activities in the societies to know them. At the same time, it confirms that humanistic tendencies and attempts are necessary to be perceived through a dialogue and humanization of economy is necessary to be connected with humanization of education. It is one of the ways of how to avoid, weaken and mainly prevent some problems, risks and threats in the world. This is one of the ways towards humanization of economy as well as to the society.

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STAFF EDUCATION SYSTEM FOR AGRIBUSINESS – CASE STUDY POZNAŃ UNIVERSITY OF LIFE SCIENCES, POLAND

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Abstract

The problem of adjusting the existing education system to the needs of the changing labor market concerns agriculture more and more. As a part of modern agribusiness, it must not only meet the requirements of the food processing and distribution cells, but also the conditions of growing competition of agriculture of other countries from the EU and beyond. The article presents the functioning of the personnel education system for agriculture in Poland as well as the results of opinion polls of students completing the first-cycle university degree. The aim of the study was to show students' expectations of ideal professional work and perception of agribusiness as a workplace.On the basis of the conducted research five top-rated (TOP 5) characteristics of ideal work after completing education at university and five least-important ones were determined. According to the respondents, ideal work should: (i) be in accordance with interests, (ii) give a sense of pride in performing duties, (iii) ensure respect among customers and other employees in the company, (iv) guarantee a high salary and (v) have a friendly working atmosphere. At the opposite pole there were issues related to irregular work time, its mobility and fast and high rate.Analyzing the students' opinion on the subject of working in agribusiness, it was found that for 3/5 of the respondents it would be an interesting stage of a professional career, for half it would be a very good place for permanent work. The readiness to start own business after the university education was declared by as much as 34.0% of students

Keywords: *agriculture, education system, work in agribusiness, students choices and attitudes*

JEL classification: *A22, A23, D83, I25, Q13*

1   Introduction

The problem of adjusting the current education system to the demands of the changing labour market also concerns universities which educate agribusiness employees. Individual sections of agribusiness compete for qualified employees whose work will ensure clients' maximum satisfaction. There is a growing demand for qualified staff due to the rising competition among the producers operating on the domestic, European and other markets (Klepacki, 2014). While searching for competent personnel, agribusiness entities and universities alike must consider a significant social factor which has an influence on the quality of students' perception and the accessibility of workers afterwards (Kozera-Kowalska & Uglis, 2017a). This particular factor is the fact of Generation Y entering the labour market. Potentially, the employees from this group are mostly young people, born after 1980, growing up in the market economy conditions, in the times when modern technologies were rapidly developing. For the Ys, the digital world is not only an obvious source of information, but also a way of spending time and building social relationships (Stachowska, 2012). In contrast to their predecessors, they are less fitted into the reality of the physical sphere of economic processes, but they are inclined to support their work with knowledge, which directly results in the increasing innovativeness of the sectors where they find employment. Their functioning on the labour market reflects the unavoidability of the socio-economic changes taking place not only in agribusiness, but in the whole economy (Rynkiewicz, 2014). It has become a challenge for universities responsible for the education of high quality employees, also for agribusiness (Orczykowska, 2006, Ciechanowska, 2014).

The author focused on the first-cycle university studies graduates. The aim of the analysis was to present opinions concerning ideal work environment, as well as to define the expectations from such work, especially the perception of agribusiness as the target employment sector. The qualifications that are required and the awareness of the labour market reality are important aspects of educating potential workers' (at the university level) and preparing employees for agribusiness. Therefore, when discussing the obtained results, the author also considered the characteristics of Generation Y entering the market with skills different from

those possessed by their predecessors, but also with expectations concerning, among other things, the comfort, atmosphere and difficulties of the future work.

2 Data and methods

In order to achieve the aim, the author prepared and conducted a survey, using an auditorium questionnaire. The advantages of such a questionnaire include the possibility of controlling the measurement and maintaining anonymity at the same time, an uncomplicated organization of the study, relatively low cost and a high response rate. Considering the object of study, while devising the survey, the author adapted a questionnaire used by Bednarska (2014) for a study concerning the HoReCa sector. A large part of the survey consisted of questions regarding the features of ideal work after completing the first cycle of university education. In another part of the questionnaire, the respondents were asked about work in agribusiness and their plans to start their own business activity after graduation. The evaluation concerned the total of 29 features of ideal work and 6 questions regarding work in agribusiness. They were evaluated using the 7-point scale (1 – strongly disagree, 4 – undecided, 7 – strongly agree), which made it possible to increase the accuracy of difference measurement in the evaluation of the features. The survey was conducted in 2017 and 2018 among animal science (zootechnics) students before their diploma exam, closing the first-cycle of studies.

The collected source materials underwent statistical analysis, using the Statistica 13.1 program. The Kruskal-Wallis test and the Mann-Whitney U test were used to assess the homogeneity of the distribution of the studied variables. While, the V Cramer coefficient was used to determine the strength of the relationship between the variables.

3 Results and Discussion

The study included 94 animal science (zootechnics) students from the Poznań University of Life Sciences (PULS), in regarded by the Polish Accreditation Committee as the best in Poland. The study sample made up 70% of the statistical population. The participation in the study was free and anonymous. The majority of respondents (final year BA students) were female. The respondents were aged 22-23, which made them members of Generation Y, consisting of people born in 1980-1990 (Zagórowska, 2012). Their attitude to life had been strongly influenced by globalization, which softens the borders between countries, makes it possible to internationalize enterprises, as well as leads to the filtering and merging of cultures. The factors which improve Generation Y's skills, and partly also increase

their expectations from the future work include computerization, the Internet and access to global information resources (Kachniewska & Para, 2014). It was assumed that these processes had an influence on the decisions taken by the graduates participating in the study, which is confirmed by some descriptions of this population. It turned out, for example, that over half of the respondents had some working experience – they purposefully combined education with work. Nevertheless, the remaining 44% opted for gaining knowledge and skills in accordance with the studied subject, without working during studies (table 1).

Table 1 **Sample structure**

Specification	Category	(%)
Sex	women	76.6
	men	23.4
Work experience – total length of service	none	44.7
	up to 12 months	33.0
	over 12 months	22.3
Readiness to start own business activity after finishing studies	yes	34.0
	no	66.0

Source: Author's research results.

Many authors point out that the educational process during university studies should prepare students to demonstrating enterprising initiative by starting their own business activity. It is also assumed that higher education encourages people to take the risk of running a private business, especially after finishing studies (Jelonek, 2011, Piróg, 2013, Kozera-Kowalska & Uglis, 2017b). Although research showed that 34% of the respondents were planning to start their own economic activity, a part of them do not do it after passing the diploma exam but take up the second cycle university studies. These results correspond to the general description of Generation Y, particularly as regards the life-work balance, the career target and the sense of freedom, the latter being the key feature of the generation (Smolbik-Jęczmień, 2013). Taking the above into account, it seems interesting to analyse the respondents' expectations as regards ideal work (table 2). A detailed analysis of the results showed a considerable diversification of ratings with reference to individual features, which was indicated by the calculated changeability coefficients.

Table 2 **Perception of the image of ideal work**

No	Specification	Ideal work	
		Average	Standard deviation
X_1	Work according to interests	6.65	0.67
X_2	Work which is challenging	5.76	1.18
X_3	Gives an opportunity to fully use the acquired knowledge and skills	6.30	1.07
X_4	Ensures a considerable diversity of tasks	6.18	1.05
X_5	Gives an opportunity to decide how you wish to perform your duties	5.99	1.21
X_6	Involves a large number and fast pace of performing duties	5.11	1.33
X_7	Involves flexible working hours	3.72	**2.19**
X_8	Involves mobility	3.72	**2.05**
X_9	Easy access by transport	5.89	1.45
X_{10}	Is done in an attractive destination	5.19	1.82
X_{11}	Guarantees high remuneration	6.37	0.98
X_{12}	Offers a wide range of social benefits	5.69	1.48
X_{13}	Provides modern equipment necessary to perform work duties	5.95	1.16
X_{14}	Offers stable employment conditions	6.34	1.13
X_{15}	Gives the employee the possibility to influence the decisions important for the company	5.52	1.43
X_{16}	Ensures a clearly set career / promotion path	6.06	1.19
X_{17}	Gives the possibility to raise qualifications	6.31	1.01
X_{18}	Provides the possibility of long-term professional development at a given company	6.02	1.24
X_{19}	Guarantees learning skills useful at other workplaces	5.98	1.18
X_{20}	Allows the employee to combine work duties with private life	5.79	1.59
X_{21}	Friendly atmosphere at the place of work	6.35	1.05
X_{22}	Ensures respectful treatment by clients and co-workers	6.45	0.96
X_{23}	Gives a sense of support from co-workers	6.17	1.20
X_{24}	It is performed together with competent co-workers	6.16	1.20
X_{25}	Gives a sense of belonging and integration with the team	6.10	1.23
X_{26}	Involves offering high quality products/services	5.93	1.42
X_{27}	Enjoys considerable social prestige	5.65	1.34

No	Specification	Ideal work	
		Average	Standard deviation
X_{28}	Gives a sense of pride with performing work duties	6.56	0.78
X_{29}	Work is done at an enterprise which serves the local community	4.68	1.69

Source: Author's research results.

Based on the research, five highest rated (TOP 5) and five least significant features of ideal work for a university graduate were established. In the researchers' opinion, ideal work should display the following features:
1. conformity with one's interests (6.7),
2. giving a sense of pride with the duties one performs (6.6),
3. ensuring the respects of clients and other workers in the company (6.4),
4. guaranteeing high remuneration (6.4),
5. creating friendly atmosphere at the workplace (6.4).

At the other end, there are issues related to the flexible time of work (3.7), its mobility (3.7), as well as its fast pace (5.1). The other less important features of ideal work included the attractiveness of the location (5.2) and the company's acting for the benefit of the local community (4.7). All the selected features, both prohibitive and negative, coincide with the Generation Y's expectations, observed in other studies (Irlbeck & Akers, 2009, Briers, et al. 2010, Chou, 2012).

Due to the construction of the research (its repeatability in subsequent years), the ratings can be compared to the earlier ones. It was found out that depending on the year in which the study was conducted, the TOP 5 list changed. The first two features (work according to interests and work giving a sense of pride with the duties) had not changed their ranking position. However, the order of the next features differed: for the respondents from 2018, features like guaranteeing high remuneration, friendly atmosphere and the possibility to make full use of the acquired knowledge and skills, play a much more important role than for those from 2017. It also turns out that in the case of the least desired features, the ranking did not change. In order to define the differences in the ranking of all 29 features, the Mann-Whitney U test was additionally run (the year of research, respondents' sex, place of residence). The researchers confirmed a statistically significant diversification of responses ($p<0.05$), with reference to the year of study, for four features: X_2, X_{13}, X_{19}, and X_{26}. The place of residence variable turned out to be significant in the case of three features: X_{16}, X_{18} and X_{20}. However, there was no significant diversification with respect to the respondents' sex ($p>0.05$).

In order to highlight the features of ideal work, they were grouped into five categories:

- work contents (X_1-X_{10}),
- economic benefits (X_{11}-X_{14}),
- career prospects (X_{15}-X_{19}),
- social relations (X_{20}-X_{25}),
- reputation (X_{26}-X_{29}).

The results for the categories listed above are presented in Figure 1, the analysis of which points to the diversification of expectations with respect to individual aspects, as it was confirmed with the Kruskal-Wallis test, with H = 55.77 and p = 0.000, confirming a statistically significant diversification of opinions among the respondents.

Figure 1 **Expectations from an ideal workplace**
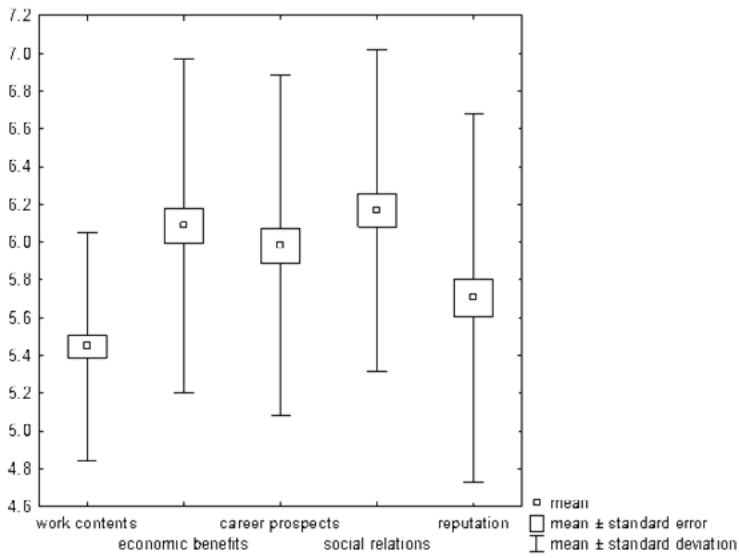
Source: Author's calculations.

Undoubtedly, the most desired attributes of future work they indicated included: positive social relations, economic benefits and possibilities of professional self-development. These opinions correspond to the Generation Y profile – when the relations are good, the respondents take up work willingly, when bad – they quit; they change work when they consider its conditions to be unsatisfactory; they follow their own career plan which does not always comply with the

traditional model; they are their own bosses and create their own professional reality (Pikuła, 2016). The possibility to observe the development of one's own career was the object of further studies.

The main research interests included issues referring to the evaluation of the possibilities to develop one's professional career in agribusiness. As it was stressed by Uglis and Kozera-Kowalska (2016), the animal science (zootechnics) course provides specialists for enterprises representing an economic sector with a narrow but varied scope of activity. Zootechnical entities include companies specialized in supplying animal raw materials (e.g. milk, meat) and means of agricultural production which provide services, as well as companies providing specialist counselling and educational activity. The awareness of the diversity of the potential employment sector seems to have had an impact on the study results. The students participating in the study agreed with the statement that work in agribusiness would be an interesting stage in their professional career. In the opinion of half of the respondents, the agribusiness sector would be perfect for permanent, long-term employment. However, only every fourth respondent planned to connect their career with agribusiness permanently (table 3).

Table 3 **The attractiveness of work in the agribusiness sector**

Specification	Average	Standard deviation
I think work in agribusiness would be an interesting stage in my professional career	4.86	1.49
I think that connecting my professional career permanently with agribusiness is an interesting option	4.36	1.75
I want to permanently connect my professional career with agribusiness	3.36	1.91
I often speak positively about agribusiness as work environment	4.19	1.80
I think that I will have no problems finding work outside agribusiness, on similar or better conditions	4.70	1.47
I am going to take up the job of a business representative in agribusiness	2.62	1.74

Source: Author's research results.

The last issue approached in the study was the declaration of readiness to start one's own economic activity after graduating. The analyses that were conducted showed that 34.0% of the respondents declared an intention to start their own business. At the same time, positive attitudes to entrepreneurship were declared

by 31.9% of female and 40.9% of male respondents. However, the chi square test did not indicate a statistically significant impact of the respondents' sex on their readiness to start individual economic activity. On the other hand, the researchers found a relationship between the willingness to start own economic activity and work experience. V Cramer's coefficient calculated for this purpose (0.273) indicates a positive relationship of medium intensity. The regularity is also confirmed in other authors' studies (Kunasz, 2008, 2013).

4   Conclusions

The research that was conducted fits into the discussion on taking up work by university graduates and the standard of education systems, as well as the demand for specialized employees in the economic sector. The research also concerned the problem of entering the labour market by representatives of Generation Y, whose system of values and the way they perceive gainful work differs considerably from those represented by the previous generation. Moreover, deliberations were directed towards the complex system of agribusiness. In this broad context, the author analysed the awareness of the labour market reality and the perception of work by the graduates of the first cycle university studies, specialized in the very narrow sector of animal sciences.

The research results seems to be optimistic, as regards verifying the educational activity conducted by the PULS and satisfying the demand of the agribusiness labour market, especially the companies that employ animal science specialists. It turns out that working in this sector is not only described as interesting, but it may also become the area of starting own economic activity for nearly 1/3 of the respondents. Such opinions are expressed by the respondents, regardless of their experience and sex. This is consistent with the Generation Y's profile, represented by the respondents. As regards the model of ideal work, they stress the conformity of work and interests (and expertise), the sense of pride with performing one's duties, and the possibility to gain respect among friends and clients. It is also important that despite the passing time (repeatability of research in time), the respondents do not significantly modify their opinions. The features they mention correspond with such features of Generation Y, such as predilection for the freedom of decision, independence and individually shaping one's own career path.

Although the study results presented herein are fragmentary, because they regard the graduates of only one university course, they still give an idea of the respondents' situation, attitudes to and interest in their future professional work. In conclusion, we may say that specialist university education prepares future

employers who not only represent a high level of knowledge, but are also fully aware of the labour market reality, which bodes well for the future of the economy.

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PROFESSIONAL PRACTICAL TRAINING OF FUTURE TEACHERS IN VOCATIONAL EDUCATION AND ITS´ REFLECTION BY STUDENTS OF SLOVAK UNIVERSITY OF AGRICULTURE

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Abstract

Teaching experience is an integral part of the pre-gradual preparation of teachers, and is perceived as the bridge between theoretical and practical training. It is also a tool for the development of professional competences of future teachers and therefore it is necessary to pay attention to it in terms of theory, research and practice. The paper presents the theoretical background and briefly describes the results of empirical investigation, which was conducted in conditions of Slovak University of Agriculture. The paper describes the current state of practical teacher training in Slovakia and provides specific findings in the field of self-reflection and evaluation of teaching practice by student teachers of professional vocational subjects at Slovak Agricultural University in Nitra. Through the regular feedback gathered from the student teachers can be constantly improved the professional practical training of future teachers, which finally can influence the overall quality of vocational training.

Keywords: teaching practice, teacher preparation, teachers of professional vocational subjects, university student

JEL classification: *I21, I23, J44*

1   Introduction

Professional competencies are currently being discussed in the context of the need to ensure quality of teacher training, and there are also views on the need to construct various new models of higher education in teacher preparation. "*The current world is strongly interconnected and countries must adapt to the new conditions especially in the area new educational activities*" (Mravcová, 2014, 470). There is a permanent discussion on the content of the study, especially on the proportion of theoretical and practical parts of study.

The pedagogical practice and the development of the teacher's professional competencies can be realized only in close connection with the theoretical knowledge gained in the study of particular professional, pedagogical and psychological courses. The Reflective Practice concept is also becoming a key model for designing practical training for future teachers as part of their higher education. The study provides brief theoretical background and results of the survey on reflection of observation practice of students from Slovak University of Agriculture.

1.1   Professional pedagogical practice

Teacher education consists of four core components: 1. vocational education; 2. pedagogical-psychological education; 3. professional-subject area; 4. pedagogical practice. Practical training is a necessary part of the preparation for the teaching profession. Pedagogical practice belongs to the fundamental forms of tertiary education of future teachers. It is implemented in the curriculum through compulsory courses of pedagogical practice. The pedagogical practice have an integrating and practical-training character, it follows the theoretical and practical study of the students at the faculty and is realized within the scope defined by the curriculum. "*The students as future teachers need an education that will prepare them for present and future opportunities and challenges*" (Mravcová, 2015, p. 646). Pedagogical practice is conducted in the conditions of a specialized workplace (training school) and under the guidance of qualified specialists (training teachers). From other courses of higher education, it differs mainly by providing students with space for independent creative teaching in real school practice. Practical activity of students in training schools has the character of the supervised, controlled and evaluated activities by authorized persons. Key players in teaching practice are: student teachers, teachers of pedagogical and vocational courses in higher education, faculty teachers of subject / field didactics, training teachers from primary and secondary schools.

Pedagogical practice, which is the main source of pedagogical knowledge and natural environment for the integration of professional – field subject, psychological and pedagogical knowledge, has several organizational forms.

In introductory reflective observations, students get orientation in the activities of teachers and pupils, learn to observe the conditions in which the pedagogical situation is taking place. It provides a systematic development of the pedagogical competences of the student, opportunity to perceive and orientate in pedagogical situations, to describe and analyze them. These lesson analysis are designed to show students' ability to apply and verify theories in specific pedagogical situations. The most important part of pedagogical practice is **teaching performance**. It allows students to enter the school life, realize their own ideas, models of teaching, and also give space for their appropriate activity. In addition to preparing for the teacher performance, and its´ realization, there is a great emphasis on the analysis and assessment of the performance - the lessons analysis. Through it students get a deeper insight into pedagogical phenomena, they think about the educational process and reveal the secrets of teaching activity. The lessons analysis are seen as a positive motivation both for the student and for the training teacher. During the teaching performance assessment the student expresses their views on the lesson.

The highlight of the practical preparation of the students is a **continuous pedagogical practice – placement at selected training school** (includes teaching performance, work with a pedagogical agenda etc.), which focuses on the following: - to be acquainted with the climate of the school, organization of the school; - to analyze teaching performance with the participation of training teachers, - to select appropriate means of expression, to formulate ideas clearly, to create a suitable atmosphere in the classroom, to build up relation with pupils, - to respond appropriately to specific situations, - work with experienced teachers, - to work with parents, - to organize out-of-class events with children, - to make use of regional specificities in particular subjects, - to work with documentation about pupils.

Students first learn to observe (describe, analyze, evaluate) and after this they learn step by step to project, implement and evaluate their own teaching performance. The fulfillment of the requirements is directly checked and evaluated by the **training teacher**, but the level of the pedagogical competencies development should be evaluated also by the **faculty teachers** of subject/field didactics or **coordinator of the teaching practice.** Evaluation and assessment is based on analysis and of various evidence such as: *Videos* of parts of the student's teaching units that demonstrate that they have applied effective teaching practices; *Student assessments* of lessons and subjects taught during pedagogical practice; Observations

records and *assessments by mentors* (faculty teachers, methodologists, etc.) *or classmates* during the teaching units that the student taught during pedagogical practice; *Didactic tests* or other written statements of pupils created or evaluated by the student teacher during the pedagogical practice; *Observation records* of the lessons the student has attended; *Diary* from pedagogical practice, written preparation of the student for teaching (Zaťková, 2008).

Reflective diary and portfolio used as part of the activities of pre-service teaching practice is a tool for descriptive, reflective and/or critical recording of professional experiences lived by the student in teacher training situations. As states Trif and Popescu (2013) the reflective diary helps organize the activity of guided analysis of pedagogical practice experiences aimed at: identifying students' own needs, interests, training motivation, the degree of mastery of past acquisitions, shaping an accurate image on their effectiveness in practical teaching situations. The analysis, processing and interpretation of such a structured reflective diary is focused on the following areas: characterizing the school climate factors where students conduct teaching practice; analyzing the relationship between the school mentor and student; identifying the strengths and weaknesses in terms of classroom management. (Trif & Popescu, 2013).

Although there is a high degree of autonomy in the universities and colleges preparing teachers, each college creates its own model of practical teacher training. "The increased processes of internationalization have impacts also on changes in the structure and content of educational systems within countries" (Svitačová & Mravcová, 2014, p.44). Among different models of pedagogical practice is however possible to identify certain common trends both in Europe and in the developed world, e.g.:

- Practical preparation has a **gradation character**. It creates a system of follow-up (usually three or four) different types of practice with the increasing difficulty of tasks for students. Often begins in the conditions of the faculty with practices or trainings that are preparing to enter school. It continues with observation of pupils, classes and lessons, then with micro-performance and assisting activities of the students, followed by the sequence of the lessons taught by the individual students up to the continuously realized longer-term teaching in one class.

- Careful attention is given to the **orientation on student'sprofessional competences** and the level to be reached at the end of the study (performance orientation). Even in reflexive approaches, competencies are the content of practical training and the criterion of student assessment.

- There is also a focus on the **reflexive nature of practical training** and a particularly strong emphasis on the self-reflective skills of the future teacher achie-

ved through structured self-reflection. Even in competence models, reflection and self-reflection are an important tool for learning of the students. Often are to the reflection of student practice devoted various group activities or seminars after passing the different types of practice that are led by a faculty teacher along with a training teacher.

- There is also **a tendency to demonstrate evidence of student competency** through the **student portfolio**. The portfolio as output of practical training, including structured requirements, appears in all countries and models of teacher preparation. Differences are in the function, whether it´ primary importance is for student assessment or for learning of the student. More and more is actually mentioned electronic or an interactive portfolio.

- The basis of good implementation of the practice is **the close cooperation between the training school and the university**, constant pedagogical and scientific-research care of the quality of training teachers, their education, harmonization of requirements for students, etc. Very often, one of the training schools, sometimes called a laboratory, faculty or university school, is directly an organizational part of a higher education institution. Experts in field didactics and practitioners teach each other, jointly lead students to practice and their reflection, carry out research projects, and so on. Furthermore, it is possible to identify an increasing emphasis on **the role of mentor (training teacher)** and increasing level of requirements for performing this specialized function.

- There is **increasing the importance of student assessment in pedagogical practicefor the overall success of studies**, e.g. in Canada, failure to meet the specified level of competency, or in the Netherlands, the lack of portfolios of a certain quality means abandoning a study; in Ireland, even the assessment of pedagogical practice significantly influences the admission of the job seekers to the school (Spilková &Tomková, 2010). In several countries, the defence of the selected portfolio problem is part of state examinations. (Kosová & Tomengová et al., 2015, pp. 23-28)

1.1.1 Realization of pedagogical practice in conditions of Slovak University of Agriculture

At Slovak University of Agriculture in Nitra (SUA) is the preparation of teachers of vocational subjects carried out within the framework of accredited programs of the Supplementary Pedagogical Study (SPS). Centre of Pedagogy and Psychological Counselling at Faculty of Economics and Management (FEM) SUA prepares teachers of professional agricultural, economic, food and technical subjects. In

this type of study, in accordance with the guidelines of the Ministry of Education (MŠVaŠ, 2014), the implementation of the practice is graduated in terms of development of teacher professionalism (orientation, diagnostic, didactic-projecting and integration-realization practice within 40 lessons).

SPS students undertake a pedagogical practice in a given period at training schools, which is divided into two parts during the 3rd and 4th semesters of the SPS and the practice follows the Guidelines for the realization of Pedagogical Practice of Students of the Supplementary Pedagogical Study (valid at SUA in Nitra). Pedagogical practice is carried out in cooperation with training schools. With these schools SUA concluded bilateral agreements on mutual cooperation in the field of preparation of teachers of agricultural, food, economic and technical subjects. Pedagogical practice is divided into two parts: **1. Observation practice in vocational subjects**. It consists of **orientation practice**, which includes instruction by coordinator of practice and by training teachers, observation of pedagogical activities of the teacher, processing of observation records. **Diagnostic practice** consists of student observations and subsequent analysis with training teachers. A final portfolio is required evidence of the student´s activities during the teaching practice according to the practice guideline. **2. Teaching performance practice** consists of a **didactic - projecting** part comprising didactic analysis and written preparation for the teaching and consultations on the preparation with a training teacher. Immediately after it follows **the integration and realization** part of pedagogical practice. Component of this practice are the **final teacher performance** of the student, analysis of the practice experience, the assessment of the diary and the final assessment of the student. Students during their teaching practice take part in meetings of the Pedagogical board of the school, meetings of particular Subject Committees and participate in other activities related to the educational and organizational work of the training school. Students write a practice diary, which is signed by the training teacher and the director, of the school. The reflective diary is an effective professional training instrument for future teachers. The student is required to submit it to the coordinator of practice at the faculty for review. Its processing is a prerequisite for completion of the practice. The practice ends with the final teacher performance in front of the commission consisting of: the teacher from Centre of pedagogy at SUA as chairman of the commission, the director or the authorized representative of the school and the training teacher. (CPPP FEM SUA, 2014)

1.1.2 Reflection and evaluation of observation teaching practice by students of the Slovak University of Agriculture

Slavík and Siňor (1993, p. 157) define the specific reflective competence of a teacher as the teacher's readiness to reflect and evaluate the pedagogical procedure, to diagnose its own activity and to derive knowledge from it for positive influence (In Průcha, 2002, pp. 106-107). Kyriacou includes among the basic pedagogical competences the evaluation of the pupils' achievement and the reflection and self-evaluation of their own work (Kyriacou, 1996, p. 26). It is important that these areas of pedagogical competencies are purposely developed during the theoretical and also practical teacher training, primarily by ensuring good methodical and practical training. These characteristics of reflective competencies are particularly emphasized in order to highlight the requirement for a teacher to compare himself as competent in his profession. Recognizing potential deficiencies is a necessary beginning to remove them. Teachers should therefore develop their own self-reflection or individual self-evaluation as part of their preparation. "Self-reflection is understood as awareness of their own teaching knowledge, experience of pedagogical activity and especially of pedagogical decision-making" (Obst, 2006, p. 175). The self-reflection of a teacher is an indispensable part of the profession. Hupková (2004, p. 43) states that "deliberate, purposeful and planned self-reflection allows the teacher to learn more about their own educational activity and the possibilities of its innovations. The teacher systematically focuses attention on the planning, realization and evaluation of their own work, using various self-reflection methods in order to eliminate the existing deficiencies and to constantly improve their own activity and the educational process." At this point, we would like to emphasize that not only the assessment of pupils, their learning and the achieved results is an important part of the teaching competencies, but also the reflection, self-evaluation and evaluation of the teacher's own pedagogical work. The development of reflective competences of the teaching staff is realized through various activities even during observation pedagogical practice.

Observation practice in the SPS at SUA is realized in groups according to the field specialization of students. It includes: **Orientation practice** includes: Instruction to Educational Practice by Coordinator of teaching practice or teacher of the teaching practice course from Centre of Pedagogy at SUA and training teacher at the training school, continuous observation of the pedagogical activity of teacher of professional subjects by students - during teacher's working day, processing of observation record (4lessons). **Diagnostic practice** includes: - observations of students, processing of observation records and analysis of the observed lessons with training teachers (10lessons).

In addition to the observation of general conditions of the visited school, the student completes assistant activities in the lessons and records the observations of attended lessons to the **activity report** and to the **observation report**.

The output from the observation practice is a portfolio containing an activity report from practice, a report on pedagogical practice and student's records that contain relevant information about the particular elements of the lesson structure - the form of the records is elaborated according to the template (Šeben Zaťková, 2015). The evaluation and the own reflection of the pedagogical practice are realized by the students especially by filling in the space for analysis of the lessons attended with the teacher and notes in the observation reports, but also by completing the separate **Pedagogical Practice Report**, which contains two parts, namely:

1. The evaluation of the training school and the training teacher: (1. Material-technical conditions of the training school, 2. The approach of the training school to the practice of the student, 3. The approach of the training teacher to the student's practice, 4. Recommendation of the training school for the pedagogical practice, 5. Recommendation of a training teacher for guiding pedagogical practice).
2. Self-reflection of the student (non-teaching activities organized by the school the student participated in; formulation of the pedagogical problem student encountered during the pedagogical practice).

2   Data and Methods

In the study was used text analysis of the theoretical background and descriptive quantitative analysis of the results combined with the qualitative interpretation of data. Empirical investigation was conducted in conditions of Slovak University of Agriculture and provides specific findings in the field of self-reflection and evaluation of teaching practice by student teachers of professional vocational subjects at Slovak University of Agriculture in Nitra.

The above-mentioned model of pedagogical practice and its evaluation (chapters 1.1.1 and 1.1.2) is applied at SUA from 2015. In the study is compared the reflection of observation practice by students in the full time study in the period of years from 2015 to present 2018 (3 academic years). Students were placed at training schools in the city of Nitra. Number of students in particular years was different, therefore also the number of training schools varied. In 2015, the pedagogical practice of students was conducted at 4 schools, in 2016 at 3 schools and in 2017 at 8 secondary vocational schools. Overall number of students was 67.

As tool for data gathering was analysis of Pedagogical Practice Report filled in by students in 3 academic years between 2015- 2018.

3   Results and Discussion

Pedagogical practice report consisted of 7 aspects that were assessed by students. 2 aspects were assessed through given answer options and the other 5 aspects were evaluated by filling in own answer. Students assessed material-technical conditions of the training school; The approach of the training school to the practice of the student; The approach of the training teacher to the student's practice; students listed non-teaching activities organized by the school the student participated in and formulated pedagogical problems they encountered during the pedagogical practice.

Recommendation of the training school for the pedagogical practice and recommendation of a training teacher for guiding pedagogical practice were answered by selection of the appropriate option.

Tables 1 to 3 show the students' evaluation of material and technical conditions of the training schools.

Table 1 **Material and technical conditions of the training school 2015/2016**

2015/2016	
Excellent (notebooks, interactive boards, tutorials, internet)	8
Excellent, each classroom has a dataprojector, an interactive board. The pupils confirm their arrival electronically using the card, the registration in the electronic classroom book	1
Very good	4
The school is well-equipped with ICT, dataprojector, interactive whiteboard, but light curtains make it impossible to see anything at whiteboard	1
Adjusted to lessons, functional tools in the classrooms, the most often used was data projector	1
Dataprojector, interactive whiteboard	1
Suitable	3
Satisfactory	2
Classrooms, blackboard	1
Classrooms without an interactive whiteboard, lack of ICT (few photocopiers, computers), equipment of laboratories at a good level	3
Unlisted	1
Total	**26**

Source: Author's calculations.

Table 2 **Material and technical conditions of the training school 2016/2017**

2016/2017	
Excellent	4
At high level	1
On a very good level, specialized classrooms have computers, interactive boards, dataprojectors, ecological boards, Internet	1
Very good	9
Pc, interactive whiteboards, dataprojectors	1
Classsrooms for vocational subjects, classrooms for teaching informatics, rooms for practical training, gymnasium, sports grounds, dining room, buffet,	1
Good, some classrooms were without a data projector	3
Total	**20**

Source: Author's calculations.

Table 3 **Material and technical conditions of the training school 2017/2018**

2017/2018	
Excellent	4
Very good: textbooks, interactive whiteboards, computers, laboratory aids	4
Good: new laboratory, well equipped	4
Good, interactive whiteboard, PC, dataprojector, models	7
Good	11
Dataprojector, notebook, internet, TV with videorecorder, combined whiteboard (chalk, fixa) in each class	4
Textbooks, dataprojector	3
Average equipment	1
Sufficient, laboratory very well equipped	3
Total	**41**

Source: Author's calculations.

From student assessments, we can summarize that training secondary vocational schools are equipped with adequate technology and material tools. Positive evaluations prevailed among students, although in the year 2015/2016 three students stated that some classes did not have interactive boards and in 2016/2017 the same number of students said some of the classrooms lacked data projectors. At present, training schools are equipped with the appropriate teaching technology,

and students had the opportunity to be acquainted with it according to the needs of their individual practice.

Table 4 **Non-teaching activities organized by the school I participated in**

2015/2016		2016/2017		2017/2018	
Pedagogical supervision in the hallway	6	Pedagogical supervision	7	Pedagogical supervision	5
				Pedagogical supervision and lesson about educational problems	1
				Pedagogical supervision and guard in PC classroom	5
Practical training	3	Practical training	1	Excursion	2
Meeting of the parental association	2			Educational concert	4
No	9			No	5
Unlisted	6	Unlisted	12	Unlisted	19
Total	**26**	**Overall**	**20**	**Overall**	**41**

Source: Author's calculations.

In the table 4 were listed the activities in addition to the observed lessons in which students took part in their practice. In summary, at each year, the over-majority of students did not engage in other activities (we assume that the blank items meant that students did not attend other activities beyond the prescribed lessons). The activities attended by students included mainly pedagogical supervision, it was followed by participation in practical training, excursion, meeting of the parental association and in 2017 four students took part in the educational concert.

In the table 5 are shown results of students´ evaluation of the approach of the training school to their pedagogical practice and in the table 6 subsequently, the approach of the training teacher. The specific formulations of the students´ assessments and their numbers in each year are presented in Table 5.

Table 5 **Approach of the training school to teaching practice**

2015/2016		2016/2017		2017/2018	
Excellent	7	Excellent	13	Excellent	13
Very good	4	Very good, helpful	1	Very good	8

2015/2016		2016/2017		2017/2018	
Very helpful	3	Willingness and patience in every direction	3	Good with friendly approach	1
Accommodating to the needs of the student teacher	6	At high level	1	Good and helpful	8
Everyone tried to help, to advise	1	Pedagogical practice has been organized so that I have the opportunity to observe teaching practices and situations in class as well as to teach professional subjects out of classroom environment	1	Responsible and willing	4
Positive approach to practice	1	Management of the school showed interest in student, they willingly provided information about possibilities of graduates' employment in the field, they provided information on school education program, curricula, and pedagogical documentation	1	Kind and helpful	5
Willingness to help, explain, advise	1			Professional but helpful	1
Unlisted	3			Positive	1
Total	**26**	**Total**	**20**	**Total**	**41**

Source: Author's calculations.

We can conclude that the approach of the training school has been positively evaluated by all students. No negative evaluations have appeared. Prevailed characteristics of the school approach to the students practice such as excellent, very good, helpful and friendly.

Table 6 **Approach of the training teachers to teaching practice**

2015/2016		2016/2017		2017/2018	
Excellent	8	Excellent	12	Excellent	13
Very good	2	Very good	1	Very good	9
He was willing, familiar and informed me about the whole school and teaching	3	At high level	1	Helpful	5

2015/2016		2016/2017		2017/2018	
Willing, helpful	5	Helpful, willing, kind, open	4	Willing and helpful	5
He was open, trying to surrender his experiences, problems that we might encounter	2	Teachers 'approach was beneficial for me, as it allowed me to acquire the knowledge, skills, attitudes and experience necessary for the profession of a teacher	1	Positive, willing to advise	4
The teacher has contributed both quantitatively and qualitatively to make the teaching practice more effective	2	Lovable, empathetic, friendly and willing to explain or help anything	1	Humanistic approach	1
The teacher contributed to the effectiveness of the practice and was the example of ideal teacher through the whole practice	1			Friendly and helpful	1
Very positive, trying to teach me as much as possible	2			Responsible, helpful	3
She tried to help and show us the most she could	1				
Total	**26**	**Total**	**20**	**Total**	**41**

Source: Author's calculations.

When evaluating the approach of the training teacher, listed in Table 6, no negative evaluations were found in the students 'assessments as well. Assessments contained predominantly characteristics like excellent, very good, prudent, willing, and helpful.

A similar survey was also carried out by Dytrtová (2017) at the Czech University of Agriculture, which states that guidance by training teachers seemed to be a stimulant for students, with emphasis on expertise, organization of teaching, discipline of pupils and pedagogical skills.

In Tables 7, 8, 9 are presented the formulations of the problems encountered by students during their pedagogical practice.

Table 7 **Pedagogical problem encountered by students during the pedagogical practice 2015/2016**

2015/2016	
Weak discipline of some pupils	2
During the didactic game, one pupil was unnecessarily active- she attracted attention and unnecessarily delayed the teacher and the class	1
The disobedience of some pupils; the problem for me was also subject for animal production-based practice, as my focus is rather on plant production	1
Unpreparedness of pupils to teaching	3
Differentiated approach of the school and the teacher to the disabled pupil	2
The deficiency and obsolescence of textbooks	1
Changing and moving from classrooms, so pupils and teachers have shorter breaks and lessons are starting about 5 minutes later	3
The ongoing reconstruction of the building, which sometimes disturbed the teaching process	2
In the case of internet failure there was a problem in the instruction, the teacher should also be prepared for such situations	1
No	4
Unlisted	6
Total	**26**

Source: Author's calculations.

Table 8 **Pedagogical problem encountered by students during the pedagogical practice 2016/2017**

2016/2017	
The smaller pedagogical problem occurred in the 4. A, when one pupil repeatedly interrupted during the lesson	2
Some pupils did not have books or were unprepared to lessons	1
Weak motivation of pupils	4
Pupils' discontent	1
Weak activity of some pupils, they were not interested in the subject and teaching, lack of discipline, inattention, discontent, insufficient preparation for lesson and non-fulfillment of the homework	1
Work with integrated pupils	6
Integrated pupil in the class needs special attention what disturbs pupils at work	1

2016/2017	
Missing textbooks, even if they are available, they are outdated, teachers have to replace them by their own exercises, etc.	1
No	3
Total	**20**

Source: Author's calculations.

Table 9 **Pedagogical problem encountered by students during the pedagogical practice 2017/2018**

2017/2018	
Frequent disturbance of students, inattention	1
Occasional disturbance of students	2
In higher grades was lower respect to teachers´ authority	1
Despite the effort of the teacher, pupils were unconcerned or exhibited problematic behavior	7
Insufficient interest of the pupil in education	5
Sometimes weak motivation, low activity	4
Inattention on subject matter and repetition. The pupil was not disciplined and understanding while another pupil.has been examined	1
The fear of pupils to show their knowledge among others (inactive pupils or active in bad direction)	1
Large inequalities in pupils´ knowledge in class	1
In the classroom was a pupil that requires a special approach, classmates and teacher helped him	1
Small numbers of pupils (when they were split into groups) what causes inadequate activity (even passivity) of pupils.	2
Combined class consisting of several joined lessons is not appropriate. The activity of pupils and their attention decreases, the teacher has to focus on ensuring the fluency of teaching process (I is not always simple) at the expense of the thematic plan.	1
Breaks are not enough long for teacher to prepare, inappropriate placement of the cabinet because of the need to pass through the class	1
In some classrooms there were not enough places for pupils	1
The diversity of the lesson, I see as a problem.The teacher must be flexible and adapt to the various activities of students. Whatever is the preparation for the lesson, it will always end different	1
No	1

2017/2018	
Unlisted	10
Total	**41**

Source: Author's calculations.

Students during their practice identified pedagogical problems relating to the behavior, discipline, motivation and activity of pupils in educational process. Followed problems like work with integrated pupils, respectively pupils with special needs, lack and out-of-date textbooks for vocational subjects and also organizational and spatial problems at the level of individual schools such as low or on the other side high numbers of pupils in classrooms, frequent transfers within the school premises and this is associated with demanding time requirements, short breaks, etc.

We agree that problems with discipline are the most often. In accordance with the findings of the international TALIS study was proved, that "an average Slovak teacher loses about 4.6 minutes to keep the order in the classroom. The average young teacher loses about 6.5 minutes to maintain the order in the classroom. Up to two-fifths of young teachers make order in classroom during the lesson on average for more than 10 minutes. An even more serious finding, in terms of the OECD TALIS study, is the lower self-confidence of Slovak teachers (-0.30). Young teachers have it statistically significantly lower than the Slovak average (-0.41) and up to 62% of them believe they are not respected (In Koršňáková, 2009, p. 200). Similarly, Koršňáková (2009, p. 199) notes that "beginning teachers work with ICT at a higher level than their elderly colleagues, but they have a greater lack of information on the education of pupils with special educational needs, having problems with pupil discipline and classroom leadership. These areas deserve the attention of institutions preparing future teachers."

The results on recommendations of a training school and a training teacher for pedagogical practice can be summarized as follows. Students recommended both the schools and teachers for the guidance of students during pedagogical practice. Students had to choose from answers (Yes/ Rather yes/ Do not know/ Rather no/ No). Even though in 2015/2016 one student gave the answer "*rather yes*", but the rest of answers were "*yes*". In 2016/2017 all the students gave answer "*yes*" both for recommendation of training school and also for recommendation of a training teacher. In 2017/2018 five students reported the answer "*rather yes*" for the recommendation of the teacher and nine answers were "*rather yes*" for the recommendation of school, the rest of answers in both categories were "*yes*".

4   Conclusion

Teaching practice is a linkage between theoretical education of students and their future profession. We understand it as a set of structured pedagogical situations taking place at a training school under the guidance of a training teacher. It is an integral part of the system of pedagogical, psychological, professional and practical training. The portfolio and diary serve as useful tools for student learning and also as output of practical training.

Based on the reflection of the observation practice of the future teachers, it can be concluded that the students were satisfied with the approach of training schools and training teachers to them and to their practice. They positively assessed the equipment and material and technical facilities of the schools and recommend the training schools and the training teachers for the guidance of students during pedagogical practice in the future. However, some problematic aspects and suggestions for improving teacher training indicate us the problems that students have encountered during their practice.

Based on students' indications, the following suggestions can be recommended:
- To focus in the theoretical and practical preparation of teachers on strengthening the issues related to behavior problems solving and discipline of pupils in teaching, raising and maintaining motivation, attention and activity of pupils.
- As another pedagogical problem, students indicated the work with pupils with special needs, which in practice can interfere with the smooth process of the teaching and requires individual approach to such pupils. In line with the above mentioned, we recommend to strengthen the teacher preparation for work with integrated pupils.
- As a problem, students see also lack of textbooks and outdated textbooks in vocational subjects. Of course, this issue is within the competence of the school authorities, but excellent professional training is important to help the novice teacher to cope with the challenging situations, prepares them for work with various teaching materials, didactic aids and, last but not least, teacher preparation should develop their skills in creating new text documents and learning supports. Preparation for the creation and development of a learning text is more challenging even for teachers of professional vocational subjects, as it is known that many of these subjects are the weakest covered with adequate textbooks, and the scientific knowledge in these disciplines is the fastest subject of obsolescence.

In conclusion, this survey is only a small probe in the field of pedagogical practice of students, but it is an important element that can contribute to the

effectiveness not only of practical but especially theoretical training and requires constant attention in the future.

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SESSION 10

INFORMATION AND COMMUNICATION TECHNOLOGIES – NETWORK AND INFORMATION TECHNOLOGIES

CLOUD COMPUTING CONCEPT FOR DIGITAL CONSUMERS

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Abstract

This item handles about using Cloud computing platform for providing Remote laboratories. This work show, how is possible to save money if we use centralized system for more consumers. These consumers must be digital and computing positive, because our system is provided via Internet and we using more novelty. Every consumer can use access to centralized portal in the Cloud computing from Consortium REMLABNET. All of this item is focused on environs of universities, where this cloud is existing and this we want use for remote labs. This is item from practice knowledge and experiences about system function and managing virtual platform and next construction this proposal.

Keywords: *cloud computing, virtual platform, datacenter, disaster recovery, backup, networking, availability, remote labs*

JEL Classification: *L86, D85, L63*

1   Introduction

IT departments in companies and certainly in universities are permanently under pressure to provide high quality services with reduced budget. On the other side, costs of energy for datacenters (DTCs) running and cooling call for radical changes in their organization compared to classic datacenters. Few years ago we were using a prevailing standard in the decentralization and fractionating of services

to several physical devices. This approach is nowadays under severe changes in direction to consolidation of datacenters denoted under cumulative term of virtualization. Virtualization has to offer decrease in energy consumption and increase in system performance without compromise on security of DTCs [01]

The last decade has seen the rise of the DTC computing practically in every application domain. The move to DTC has been powered by two separate trends. In parallel, functionality and data usually associated with personal computing have moved into the DTC; users continuously interact with remote sites while using local computers, either running intrinsically online applications, such as email, chat, or manipulating data traditionally that are stored locally, such as documents, spreadsheets, videos and photos. In effect, modern architecture is converging towards cloud computing, a paradigm where the whole user activity is funneled into the large DTC via high-speed networks. Simply speaking, cloud computing is a set of computers, services or infrastructure. Delivering services means reducing the work of users (clients) every day, as well as service providers and IT specialists. Cloud computing allows more access services as it reduces infrastructure delivery time from weeks to hours and it offers reimbursement for provided sources and services only [02].

Main idea of our work and this paper is in using new methods how providing remote laboratories for consumers. On the figure 1 we can see primary idea of this system. On the left side we can see individual remote laboratories, experiments, with HW and SW equipment, connected to our virtualized cloud. Core of our cloud is management system for monitoring, diagnosing and administrating remote experiments and users, or our consumers. Our consumers are everybody, who wants use experiments for education or research. This management system is named Remote Laboratory Management System (RLMS) and it is consist of few modules. For example diagnostic server, data warehouse and content management system (with schedule and calendar, communication server,…).

Figure 1 **block diagram of REMLABNET**
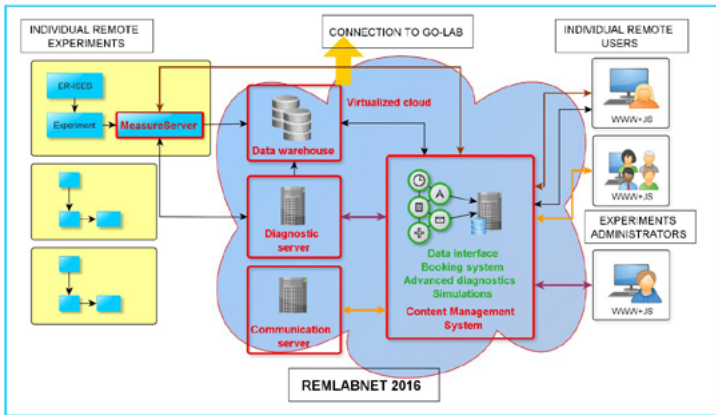
2   Cloud Computing concept

Of course, our work is primary oriented for remote laboratories, but our new idea is providing remote laboratories like cloud computing service. We are first on the world, who is providing remote laboratories via this technology. A new concept of our cloud computing is figured on the Figure 2, where we can see all interesting parts of this idea.

First, we can see main parts of cloud computing. Each cloud is based on three primary services for use [03]:

IaaS – Infrastructure as a service is a standard service for providing all infrastructures;

PaaS – Platform as a service is a standard service for providing VMs with operating systems;

SaaS – Software as a service is a standard service for providing SW features for consumers;

Virtualized DTC contains physical and virtual servers which serve a variety of services including web services, file services etc. The advantages of DTC are enabling application isolation since malicious or greedy applications cannot impact other applications co-located on the same physical server. Perhaps the biggest advantage of employing virtualization is the ability that it flexibly remaps physical resources to virtual servers in order to handle workload dynamics.

Server resources in a data center are multiplexed across multiple applications and each server runs one or more applications. These applications are usually

business critical applications with Quality-of-Service (QoS) requirements. The resource allocation needs to not only guarantee that a virtual container always has enough resources to meet its application's performance goals but also prevent over provisioning in order to reduce cost and allow the concurrent hosting of more applications.

And this is one of the aims. To construct really stable and dynamically expandable Cloud computing for using remote laboratories. To create VMs and linkage for all parts in cloud, create communication links, virtual network for cloud computing inside, and all needed parts for Cloud computing concept. The goal of our work is new and acute topic of providing a new service for the consumers - completely functioning "Remote laboratory as a service" (RLaaS) [04].

It is very important for all consumers of the Remote laboratories, where they can find this cloud concept and every remote laboratories. We are creating Consortium named REMLABNET and this is consortium of the three universities Trnava university in Trnava (Slovakia), Tomas Bata university in Zlin (Czech Republic) and Charles university in Prague (Czech Republic). REMLABNET portal is on domain name or web site www.remlabnet.eu [05].

Figure 2 **Cloud computing concept for digital consumers in Remote laboratory area**
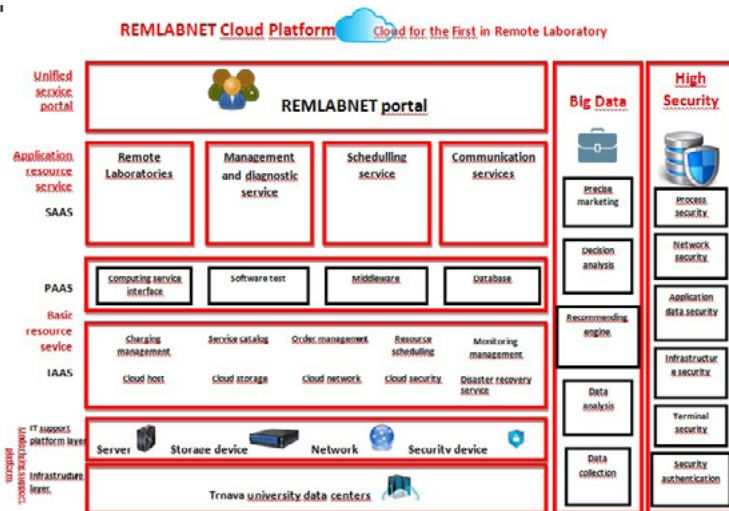
3 Benefits for the our digital consumers

Here are main benefits of the use cloud computing model [06]:

- Chop cost – pay just what is need (pay as you go model)
- High availability – just for one server is using benefits knows from big solution
- Lower impact on environment – modern technology are reduce demand on power sources
- Warrant level of provide services – availability, reaction on request
- Rate of load – solution available soon or just in few minutes

Benefits before are only for our using and our first group of the consumers. This first group are consumers, which using our system for monitoring, diagnosing and administrating they remote laboratories. Cloud computing offer very easy and very cheaper administration. Next group of our consumers are students, teachers or brainpowers, where are our experiments and our system used for education or science. Benefits for this group is primary in using experiments, possibility of the measuring on the experiments without need build it, save the measured data, using own credentials and accounts, schedule some experiment in the date and time, etc.

4 Conclusions

Our idea use Cloud computing was attesting and discussing with experts in this research part. Way of our work is good and have a big progress. We can provide new service, Remote laboratory as a Service (RlaaS) in our cloud system. Our university network providing many communications in many different protocols for different consumers, with different privileges, etc. Our consumers are primary teachers, students and brainpower of the universities and high schools, but access is possible for all consumers via Internet. This show, how is university network very overcast for communication and traffic. This claim, that network must be without failure and latency. And be secured too for management and research data protection. Security on the network is very important part, but it is without frame of this paper.

In this paper we were show our idea of construct Cloud computing system with important parts. Our work is oriented for save money in education and research with build own Remote laboratories. Many laboratories we have connected from Trnava university, Charles university and other in the world. This way providing experiments and laboratories from world to one system without

consumer's knowledge where physical experiments are. Our work is in simple terms „Bring Technology to Service!".

Next work

In these days, we work on the new subsystem of the REMLABNET with name REMLABGRAB. This system is based on our Cloud Computing and this will be gate for everybody, who want build own learning sites for our remote experiments and like extensions for build virtual reality above our laboratories.

Acknowledgments

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SLOVAK COMPANIES – OPEN ACCES TO THE DATA

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Abstract

This paper focuses on the issue of open access to the data about corporate activities. The research focuses on the comparison of applications possibilities to search this type of data in the Slovak Republic area. We focus in this paper on two applications that provide information about businesses in the Slovak Republic area. The first is IndexPodnikateľa (indexpodnikatela.sk) and the second application is FinStat (finstat.sk). For comparison purposes, we closer identify the parameters of the Slovak corporate market.

Keywords: *business, FinStat, IndexPodnikatela, open data, portal*

JEL Classification: *G32*

1   Introduction

Numerous scientists have pointed out the irony that right at the historical moment when we have the technologies to permit worldwide availability and distributed process of scientific data, broadening collaboration and accelerating the pace and depth of discovery, but we are busy locking up that data and preventing the use of correspondingly advanced technologies on knowledge.

We focus in this paper on two applications that provide information about businesses in the Slovak Republic area. The first is IndexPodnikateľa (indexpodnikatela.sk) and the second application is FinStat (finstat.sk). For comparison purposes, we closer identify the parameters of the Slovak corporate market.

The use of open data in corporate activities has got ascending tendency. If you want to carry business in the EU market, the portal European Union Open Data Portal is a very good source of information. To do business locally, it is advisable

to find a data source in the country. In the SR is suitable for this purpose portal IndexPodnikateľa. By providing easy and free access to data, the portal aims to promote their innovative use and unleash their economic potential.

2   Open data

Open data is the idea that some data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control (Auer, 2007). The goals of the open data movement are similar to those of other "open" movements such as open source, open hardware, open content and open access.

The full Open Definition gives precise details as to what this means. To summarize the most important:

■ Availability and Access: the data must be available as a whole and at no more than a reasonable reproduction cost, preferably by downloading over the internet. The data must also be available in a convenient and modifiable form.
■ Re-use and Redistribution: the data must be provided under terms that permit re-use and redistribution including the intermixing with other datasets.
■ Universal Participation: everyone must be able to use, re-use and redistribute - there should be no discrimination against fields of endeavour or against persons or groups. For example, 'non-commercial' restrictions that would prevent 'commercial' use, or restrictions of use for certain purposes (e.g. only in education), are not allowed.

It is important to be clear about what open means and why this definition is used, and there is a simple answer - interoperability. Interoperability (Wilbanks, 2008) denotes the ability of diverse systems and organizations to work together (inter-operate). In our case, it is the ability to interoperate - or intermix - different datasets. Interoperability is important because it allows different components to work together. This ability to componentize and to 'plug together' components is essential to building large, complex systems. Without interoperability, this becomes near impossible.

Management (or managing) is the administration of an organization, whether it be a business, a not-for-profit organization, or government body (Stalmasekova & Stofkova, 2016). Management includes the activities of setting the strategy of an organization and coordinating the efforts of its employees or volunteers to accomplish its objectives through the application of available resources, such as financial, natural, technological, and human resources. The term "management" may also refer to the people who manage an organization.

Open data may include non-textual material such as maps, genomes, connectomes, chemical compounds, mathematical and scientific formulae, medical data and practice, bioscience and biodiversity. Problems often arise because these are commercially valuable or can be aggregated into works of value. Access to, or reuse of, the data is controlled by organisations, both public and private. Control may be through access restrictions, licenses, copyright, patents and charges for access or re-use. Advocates of open data argue that these restrictions are against the communal good and that these data should be made available without restriction or fee. In addition, it is important that the data are re-usable without requiring further permission, though the types of re-use (such as the creation of derivative works) may be controlled by a license.

These are for example timetables, states incomes, budget, databases, list of providers of social services, register of organizations, lists of debtors or the measurement of air pollution. Sources of open data are:

- the state and public administration,
- schools and universities,
- non-profit organizations, associations,
- private companies.

3   Slovak market

Slovakia's strong industrial tradition, tax incentives, inexpensive and skilled workforce, rapidly developing infrastructure (boosted by an influx of EU funds) and fragile but real growth, make our country a preferred base for trade (Hennyeyova, Tothova & Hamasova, 2013). Since 2009, the economic growth of Slovakia has been driven by its exports. The share of foreign trade in the GDP also remains very high, at around 185% in 2015 (World Bank), making Slovakia the most open country of the EU.

Since 2011, exports have been increasing continuously, representing 93% of GDP. Trade surplus is situated at around EUR 4 billion in 2016. The Slovak trade balance had been in deficit until 2011, mainly because of energy imports from Russia and the substantial imports of machinery and electrical and electronic equipment used in the automotive and energy sectors. Nevertheless, the dynamism of the tertiary sector has contributed to improving the situation. The country represents a platform of re-exportation for the European automotive industry (Slovak production in this sector represents over 44% of the GDP). Our country's main suppliers are Germany, the Czech Republic, China, South Korea and Russia. Main customers are Germany, the Czech Republic, Poland, Austria and France.

Produced by the WWW Foundation as a collaborative work of the Open Data for Development (OD4D) network and with the support of the Omidyar Network, the Open Data Barometer (ODB) aims to uncover the prevalence and impact of open data initiatives around the world. Covering 92 countries in the present edition, the Barometer ranks nations on:

- Readiness for open data initiatives.
- Implementation of open data programmes.
- Impact that open data is having on business, politics and civil society.

The Barometer (Open data Barometer, 2015) is a truly global and collaborative effort, with input from more than 150 researchers and government representatives. It takes over six months and more than 9,000 hours of research work to compile. This report is intended to be a summary of some of the most striking findings. The full data is available online, and intended to support further secondary research into the progression of open data policies and practices across the world. We can see in Figure 1 the Slovakia's position in Open Data Barometer scale.

Figure 1 **Rankings for Europe and Central Asia**
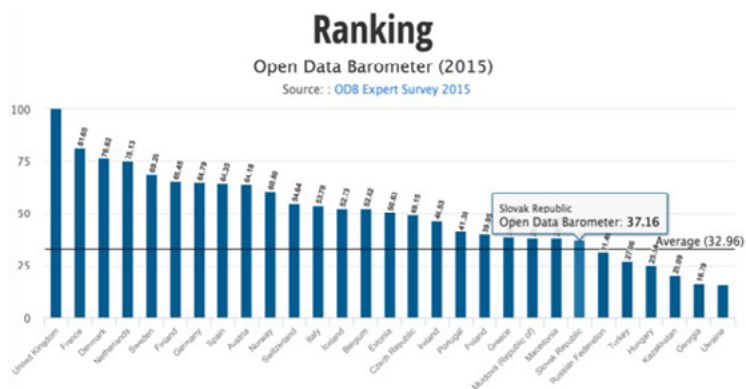
Source: Own adjustment based on Open data Barometer [online: http://opendatabarometer.org/].

Slovakia has achieved above-average ranking. There are 5.5 million inhabitants, of which more than 337,000 are self-employed. More than 290,000 are registered companies. We can say that the data from the Statistical Office are outdated, since they are published for the year 2015. We can obtain updated information from already mentioned applications IndexPodnikateľa and FinStat.

Key fact about Slovakia company market:
- Slovakia ranks 19th in the EU by total GDP and 21th for GDP per capital
- Slovakia produces many passenger cars - annually at 1 million cars per year (2015).
- Slovakia's economy was one of the quickest to recover in the European Union (EU) following the economic crisis of the late 2000s and has one of the highest economic openness scores (total imports and exports divided by GDP) of any economy in the world.
- Low inflation, a stable political environment, and the introduction of the Euro in 2009 make Slovakia a country with attractive investment opportunities.
- Further liberalization of trade is strongly supported at all levels of society.

According to the European Commission's spring 2016 Economic Forecast, unemployment in Slovakia is projected to decrease from 10.5 percent in 2016 to 9.5 percent in 2017. Low inflation (-0.1 percent in 2016), strong governmental incentives, political stability, low corporate taxes, and a skilled labour force all contribute to Slovakia's impressive investment attraction.

4   FinStat and IndexPodnikatela

These applications have their own databases and information is available immediately. Database contains information on defunct and newly established companies and self-employees. In the table below, we can see a comparison of databases of two selected applications.

Table 1 **Application and its databases**

Application	FinStat	IndexPodnikateľa
The number of companies	421 007	344 329
The number of self-employees	838 835	1 027 893

Source: Own processing.

To another database, which application FinStat contains, belong a database of financial data, a database of persons in the companies, a database of non-profit organisations. After paying fees there is also a database of Czech companies and self-employees, legal databases (e.g. register of executions and payment orders) and other databases containing information from commercial journal (e.g. auctions).

Application IndexPodnikateľa contains the following additional databases: a database of accounting statements, a database of financial analysis, a database of

records from commercial journal, a database of debtors in taxes, debtors on social and health insurance. Among published business data belong:

- registers of self-employees, companies and organizations - Commercial Register is a public register, which includes statutory data about entrepreneurs and other persons, which are stipulated by a special law,
- macroeconomic, demographic and social statistics,
- economic results of companies - incomes, profits, etc.,
- public procurement and e-marketplace,
- central register of contracts,
- a list of Slovak domains,
- contact information, company websites, catalogues,
- debtors' list (health and social insurance, taxes, duties, state claims),
- entrepreneurs in bankruptcy (bankruptcy, restructuring, small bankruptcies),
- execution proceedings,
- judicial decisions,
- register of pledges,
- information from the cadastre (land, buildings, certificates of ownership, encumbrances).

These data can be used in business. The entrepreneurs may know better the market in which they operate (Hudak, Kianickova, & Madlenak, 2017), for example: how many companies are operating in the same industry, or area, what turnover they have. The entrepreneurs may properly identify risks in the market and in the business contact (Soltes, 2016). Available information gives them an idea about their business partners. Applications, which are compared below, inform also about the changes in the monitored companies (bankruptcy, execution proceedings). Based on the data, which can be obtained from the applications, the company can compare its results with the competition, or branch, etc. And on this basis it can take improvement, or gain new business opportunities.

Examples of what data we can watch:

- results of competitors,
- the change of the name or residence of the company,
- if the company became a VAT payer,
- if the company has been declared bankrupt or restructuring,
- increasing debt of the company,
- the change of the owner or manager of the company,
- if the company rewrites properties to other persons / companies,
- if the property is on mortgage,
- if the company has made any contracts with the state.

FinStat was founded in 2012 and launched in 2013. The aim of the application was to create a web portal that helps people to, easily and for free, assess the financial health of Slovak companies.

Finstat offers a range of data feeds that are used extensively by financial advisers, accountants and investment managers Provides validated equities, gilts and fund prices as well as currencies, dividends and indices. Is deliverable as daily, weekly and monthly data feeds and can be downloaded from a dedicated website or via File Transfer Protocol (FTP) 24 hours a day, 365 days a year. Also, it is compatible with major software packages including 1st Software's Adviser Office, Prestwood, JCS, Pulse, Fairs, Investmaster, Swift, Plum, IMVS and Dividend Analysis.

FinStat has processed from the beginning a number of data sources which analyses and uses to make a picture of individual companies. By combining data sources, editing and analysing them it creates at the same time the image of the entire market - Slovak companies as a whole, individual sectors and groups of entrepreneurs.

The most important data sources, which are processed, are commercial bulletin, business register, trade register, the register of statement of finances, lists of debtors from insurance companies, lists of financial administrative and judicial decisions. There are also other data sources, which are used by FinStat.

The project **IndexPodnikatela** has been created as a tool to promote and develop a transparent business environment in Slovakia. It is an innovative and unique service that can examine and analyse any company doing business in Slovakia. Entrepreneurs can therefore receive the basic and extended information about business partners, suppliers or competitors. IndexPodnikatela provides a detailed view of the arrears of health and social insurance, tax, bankruptcy, restructuring, execution and other statements relating to the monitoring company. One of the most important outcomes of this service is also a financial analysis of the company and the index "IndexPodnikatela".

All information and data on which the IndexPodnikatela operates is drawn from publicly available databases and registries. Basic information frame is formed by the digital structured data, files in pdf, csv, xls formats and electronic scans of various documents. Detailed analysis of companies requires detailed information about financial results (financial statements) for the previous periods. They are the only one in Slovakia, who decided to digitize (convert into a structured format) all qualitative sufficient and for the processing suitable documents (scans of accounting documents). From the vast amount of data they create financial analysis of companies, predictions, but also various statistical analyses relating to the sectors, or specific lines of business.

Not every entrepreneur, self-employees, or sales representative may understand the variety of financial and economic indicators and financial analysis (Soltes & Stofkova, 2016). Therefore, because of the data received, the IndexPodnikatela decided to evaluate the reliability and performance of companies, by creating the IndexPodnikatela, which clearly shows in which financial and economic state the company is, and whether it is appropriate to establish a business relationship.

With IndexPodnikatela you can immediately verify your prospective business partner and add him to the list of monitored companies. If any problems or changes occur, the system notifies you via automatic notification.

Figure 2 **FinStat search filter**

Source: by authors.

Figure 3 **IndexPodnikateľa search filter**

Source: by authors.

In Figure 2 we can see the design of FinStat application and in Figure 3 we can see the design of IndexPodnikateľa application and also filtered data. Figure 2 shows the output for search - traders in the information technology industry in Žilina region. Figure 3 shows the output for search – self-eployees in the business field of Information and Communication in Žilina region. We can observe a difference in filter from the beginning. FinStat application uses sectors to assign the activity of entrepreneur and IndexPodnikateľa uses the branch of business according to SKNACE.

Figure 4 **Searching results in the application FinStat**

Source: by authors.

In Figures 4 and 5 we can see the filtered data. We searched for companies in the telecommunications industry in Žilina region. It was displayed the list of companies in the sector and a general information about these companies. The difference in displaying self-employees and companies is observed in the initial display of information on searching companies.

Figure 5 **Searching results in the application IndexPodnikatela**

Source: by authors.

If you click on a particular company, details about the company will be displayed, where we can find the necessary information regarding the company (Figure 6, Figure 7). Design of applications is different and also the way to get the searched information.

Figure 6 **Company details in FinStat application**
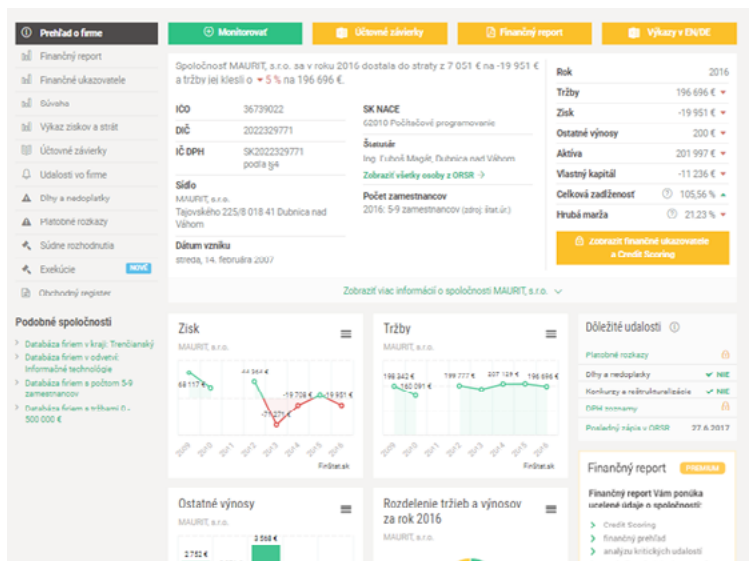
Source: by authors.

Figure 7 **Company Details in the application IndexPodnikatela**

Source: by authors.

5   Conclusion

We can point out in the conclusion that none of these applications does not have its version in English. FinStat application provides more information free than IndexPodnikateľa. In the FinStat application we can obtain free of charge information on sales, profits, incomes, assets, equity capital, gross margin, return of assets and the total debt of the observed company. On the contrary, in the application IndexPodnikateľa we can receive information only about the development of sales and earnings. Both applications provide basic information about the establishment of the company, its field of business, registration number and information on whether the company has any debts and arrears. We can find the difference between applications also in filtering capabilities of searching information. Both applications offer services free, as well as the paid services.

With these applications, the company may also find new customers with this information:

- websites, e-mails, phone contacts,
- filtering by company's legal form,
- filtering by residence (region, district, city),
- filtering by industry,
- search only uncontroversial companies,
- many other filters.

Acknowledgements:

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THE REDESIGN OF THE SEMINARS IN AN OPERATING SYSTEMS COURSE

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Abstract

The paper discusses some approaches we have applied in our department to overcome some current problems identified in our higher education system. During the last few years, we have developed a detailed study manual which guides students during their preparation for seminars. The study process is supported by formative tests and assignments for self-preparation. Two summative knowledge term tests and a comprehensive term assignment are also presented. Moreover, the summative and formative knowledge tests are targeted at higher levels of taxonomies of educational objectives in the cognitive domain. The majority of activities are supported by LMS Moodle and custom system for evaluation of term assignments. All course activities are tied together by a complex scoring system. We believe that the identified problems are common to the majority of higher educational institutions in our region, and our solutions can serve as inspiration for other academics.

Keywords: *operating system course, knowledge assessment, formative and summative assessment, course redesign, course assignment*

JEL Classification: *I21, I23, Y9*

1   Introduction

Massification of higher education systems in the Central European region and openness of educational systems of European countries for students from our country cause many new problems in Slovak higher education which we did not face in the past. Most of the problems are problems which were solved in the past by Western universities up to 40 or 50 years ago; it sometimes seems that it is enough to get inspiration from Western universities by looking at how they once

solved the problems we now face. However, academics from Western universities report that their universities are faced with different kinds of problems [5],[7],[8], so it is not so easy to rely on their experience. The problem which arises most commonly is an increase in the number of universities (about 40 at this moment), as well as the number of students. In spite of the fact that our department, the Department of Computers and Informatics, Faculty of Electrical Engineering and Informatics, Technical University of Košice, has not faced a massive increase in the number of students, the consequences of the massification of higher education are present in all their complexity – primarily in a decrease in the students' interest in studying. In addition, as we have already hinted at above, another problem is the relatively large number of Slovak students studying abroad (mainly in the Czech Republic). The next problem of regional universities (the majority of Slovak universities, including ours) is that quite a high number of capable students from our region study in the capital city at top Slovak universities.

2   Common reasons for a course redesign

We are not alone in thinking about current problems in Slovak higher education and in trying to experiment with various solutions ([1-3], [9-10]). However, we think that we have been able to find some common reasons which form the basis of our problems. Our thoughts stem from factors associated with intelligence presented by Thurston. In [4] the author states the following factors:

- the ability to affect verbal relationships,
- word fluency,
- the ability to manipulate relations in the spatial dimension,
- perceptual abilities,
- the ability to manipulate numbers
- memory,
- general ability to reason,
- the ability to reason inductively,
- the ability to reason deductively.

We assume that (the level of) intelligence across the population can be modeled by normal distribution and that university students are mentally the most capable part of the population. In this context we deduce that the massification of university education has lowered the average level of the above factors associated with intelligence.

In [6] (based on work [11]) the authors state that universities in North America underwent the process of massification about a hundred years ago while

Western Europe universities started this process 50-60 years ago. According to [6] during the transformation of the former educational system (authors refers to this system as elite with 15 % of high school graduates entering higher education) to the massive form of education (50% of high school graduates entering higher education), the application of old managerial methods can be still observed. We claim that the same might be observed in the educational process itself – we still try to apply approaches (ways of teaching) we used in the past during the era of the elite form of education.

We can take into consideration one more factor related to intelligence - intrinsic motivation to acquire new knowledge. We can reformulate it in the context of motivation to study – the lower the level of intelligence, the lower the level of motivation to study. This could explain the frustration of teachers who teach in current university classes. On the other hand, students who have been allowed to enter a university, expect to get appropriate knowledge, skills and training. They are not "guilty" of not meeting the expectations of ordinary teachers. It is up to us, teachers, to adjust educational processes in order to be able to fulfill students' expectations.

Software engineering, similar to computer science and even mathematics, is a purely abstract discipline dealing with data, information and the ways of its processing. In this context, the factors of intelligence, such as the ability to affect verbal relationships, the ability to manipulate relations in spatial dimension, memory, the general ability to reason, the ability to reason inductively and the ability to reason deductively are all crucial for students who study information technologies. A decrease in these abilities consequently influences the educational process. In this case, the main task of a teacher is to try to eliminate such a decrease in students' abilities, and to help less skilled students to increase their productivity.

3   Course organization in the past

In the past, in the period of elite education, the educational process (lectures and seminars) was rather loosely organized. The main emphasis was on lectures – the main educational purpose was to transfer teachers' knowledge to students (teacher-centered education). The seminars were usually based on the lecture contents and gave students the opportunity to understand presented topics deeply or to develop certain mental skills (e.g. in mathematics - calculation of limits, derivations, or integrals).

It was assumed that students would participate in the educational process regularly on a day-to-day basis, were able to understand the presented material, could remember facts and were able to derive reciprocal relationships. Nowadays,

complaints about students' attitudes to studying, coming from all sides, do not reflect the change, but instead hark back nostalgically to the era of elite higher education (elite - as defined in [6]).

In our subject, Operating Systems, lectures and seminars curricula were separated about 20 years ago. The main goal in doing this was to ensure that students have the opportunity to acquire required skills in the field of system programming in UNIX/ Linux operating systems and not just to memorize the basic principles.

4   Redesigned parts of course

Based on the factors associated with intelligence, it can be assumed that the average student's ability in mental processing of the lecture contents, the ability to work with literature, the ability to derive relationships between presented facts etc. is less now than in the past (during the elite university study era). To eliminate these drawbacks, a supportive study guide has been developed to help our students to cope with necessary topics. Each chapter of the study guide (published as PDF files) is introduced in the form of a mind map presenting essential concepts for a given topic (Figure 1). The objectives, the motivating scenario and the estimated time for completion of the presented topics (Figure 2) have been specified for each topic and its sections. A student is guided step by step through the study material (Figure 3) with explanation of key concepts. Moreover, the students are required to test their understanding of the topic with presented practical examples.

As mentioned above, it can be assumed that teachers deal with students with lower intrinsic motivation to study than most students had in the past. It means that we have to provide external motivation for students to study. Formative knowledge tests are used for these reasons Figure 4). These have been developed for each seminar topic in our Operating System course. The goal of each test is to motivate students to prepare for the following seminar. Sets of home assignments for each topic have also been developed to motivate students to work after seminars, We also provide opportunity for students to practice acquired knowledge and practical skills in the UNIX/Linux environment. Currently, students upload their home assignments to the LMS Moodle, where the teacher checks them manually.

Besides providing students with study guidance and formative knowledge tests, systematic verification of knowledge is also very important. Two summative knowledge tests have been developed to objectively check knowledge and intellectual abilities acquired by students. The aim was to develop test items classified at the higher levels of Bloom's taxonomy (Figure 5, 6). The higher level items

ensure that the student is able to demonstrate understanding (not memorizing) of the required knowledge and intellectual skills as well.

Figure 1 **Study guide – topic mind map**

Figure 2 **Study guide – objectives, estimated time and scenario**

Topic: OS Unix file manipulation		
Keywords		OS UNIX/Linux file system, files, file manipulation, inode
Aims	Remembering	of basic system calls for file manipulation
	Understanding	of system call parameters and the connection between them
	Application	of system calls for: • file opening, reading and writing • getting file metadata • setting access rights • file deletion
	To know	how to apply acquired knowledge to create relevant programs
Estimated time		105 min.
Scenario		Sofia already knows how to work with main pages, and she is also able to intercept mistaken system calls. Now she needs basic knowledge of system calls relevant to file manipulation.

The home assignments and the summative knowledge tests concentrate on the particular topics presented during the seminars. The comprehensive term assignment (Figure 7) was created to give students opportunity to connect together almost all the knowledge and intellectual skills presented throughout the course into one common solution. The goal is to verify knowledge and practical skills in the area of UNIX/Linux system programming, covering most of the topics presented during seminars – file handling, processes creation, program execution, communication between processes (pipes, signals, shared memory), synchronization, and network communication (UDP and TCP protocols ,IP protocol). Moreover, in order to increase the productivity of teachers, a web - based application has been developed allowing students to upload their assignments. The uploaded assignment is compiled and tested. In addition, every student is provided with the detailed protocol of translation and testing. The number of uploads is unlimited, therefore, the student has chance to modify his or her assignment. The same assignment is used for all students so the application checks all uploaded solutions to the problem of plagiarism. The teacher has an overview of the state of the student's assignment (submitted, not submitted, number of attempts, date of their successful submission, level of originality or plagiarism, etc.) and the possibility to compare the solutions of students who may be suspected of having plagiarized (Figure 8).

Figure 3 **Study guide – step by step instruction**

Figure 4 **Formative knowledge test item**

Fill in: "A semaphore is an integer whose value is never allowed ... zero." (see man 7 sem_overview, or http://www.kernel.org/doc/man-pages/online/pages/man7/sem_overview.7.html)

Answer:

As mentioned above, the problem with plagiarism was foreseen in the case of term assignment, therefore, the application was developed with plagiarism detection functionality from its beginning. Unexpectedly, certain problems with the formative tests had to be solved because of plagiarism. These tests are designed to guide a student through study materials, and thus, have a fixed structure. Some students decided to share their item answers on social networks and many of their colleagues just copied their answers and used them in their own tests. In the first stage of the problem solving it was quite easy and quick to identify not only the students who copied the answers, but also those who shared the correct answers on social networks by comparing their answers (because of open ended items and multiple valid answers, e.g. using or not using diacritics, not answered items, etc.). In the next phase, the time stamping item, provided by LMS Moodle, was used for more complex analysis and identification of the suspected students (Figure 9, 10).

Figure 5 **Summative test item – files**

Consider a file qwe.txt, the current status of which (content and the position of the file pointer) is, at the time of execution of the system call read (), defined as follows:

```
Characters:     bkkyxamtwifeiphqirkqyyvkry
position:       00000000001111111111222222
                01234567890123456789012345
File offset:    --------------------^
```

and the fragment of code:

```
//--------- beginning of the fragment
int fd,i;
char buffer[80]="PWNDSTY";
//              0123456
...
fd=open("qwe.txt",O_RDWR);
...
i=read(fd,&buffer[1],2);
...
//--------- end of the fragment
```

Specify the content of the string variable **buffer** after exectution of the above fragment of coce in the C language (Specify the string exactly, taking into account the letter case. The remaining position of the variable **buffer** contain a binary value of zero).

Answer:

Figure 6 **Summative test item – processes**

Consider three programs with the source code presented in the following table:
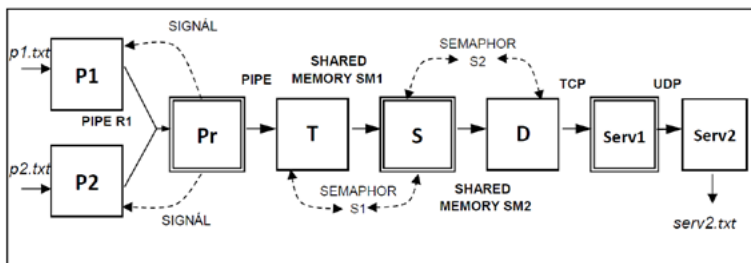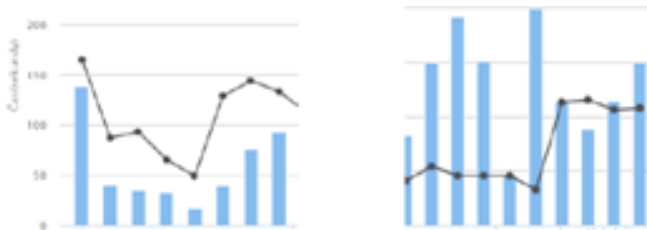
Program p1	Program p2	Program p3
| ```
main(int arc,
    char *argv[],
    char **env){
putchar("x");
execve("p1",argv,env);
}
``` | ```
main(int arc,
    char *argv[],
    char **env){
putchar("y");
execve("p2",argv,env);
}
``` | ```
main(int arc,
    char *argv[],
    char **env){
putchar("z");
execve("p3",argv,env);
}
``` |

Specify the first four characters printed on stdout which will be produced by this set of programs if we start execution by program p3

Answer.

The strict scoring system (Table 1) was designed to ensure objectivity of term assessment. Students gain points for any given activity (such as formative test, homework, summative test, assignment, documentation) At the end of the semester, each student gets points based on the sum of all scored activities and the teacher's subjective evaluation, which represents less than 20% of all the points awarded to assess a student's activity.

Figure 7 **Comprehensive assignment**

Figure 8 **Computer application for assignment evaluation**

Figure 9 **Formative test – evaluation of plagiarism – data**

Figure 10 **Formative test – evaluation of plagiarism**

Table 1 **Course scoring system**

Required activities	Formative tests	Home assignments
Summative test I. **10 points**	2 points for each test over 75% (8 weeks)	2 points for each series of home assignment (9 weeks)
Summative test II. **10 points**		
Term assignment **20 points for program** **10 points for documentation**		

5   Conclusion

The presented activities have been developed and introduced step by step over a period of several years. The complex approach described here, has been implemented during the last two years. From the teacher's point of view, we were really able to implement and refine all presented activities. The questionnaire was used to gather students' opinions. The responses vary. Some students were not satisfied with the requirement to prepare systematically, while others were satisfied and appreciated the fact that they were well prepared for midterm and final tests. A small number of students failed to gain enough points during the term and gave up before its end. We assume that it could be a future challenge for us to identify such students as soon as possible and provide them with the support they need to cope with their study problems.

Acknowledgements

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INFLUENCE OF THE INFORMATION AND COMMUNICATION TECHNOLOGIES ON ECONOMIC GROWTH

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Abstract

Progress in information and communication technology (ICT) has caused many structural changes such as reorganizing of globalization, economics or trade extension. According some surveys, ICT plays a significant role in development of each economic sector. Personal computers and the Internet provide the equipment and connectivity that allow individuals, households and companies to benefit from ICTs. Employment in the ICT sector has proved resilient to the 2007 crisis and has been growing since 2013. This trend is mainly driven by sustained job creation in information technology (IT) services and software. The aim of the paper is to point out the position of Slovakia within the V4 countries through indexes that provide an overview on economic growth in terms of the use of information and communication technologies.

Keywords: *information and communication technologies, economic growth, Networked Readiness Index, ICT Development Index*

JEL Classification: *L85, O47*

1   Introduction

Information and communication technologies (ICT) play a pivotal role in the world economy. The ICT sector is increasing its trend share of economic activity, and ICTs are important input for economic performance. Information and communications technology refers to all technology used to handle

telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions. If the company does not want to be out of step with competition and information progress as well, it must react flexibly to the changes in the IT market (Hennyeyová & Depeš, 2010).

According the Kwochko (2013) from World Economic Forum there are the five common economic effects of ICT. First one is the direct job creation. The ICT sector is, and is expected to remain, one of the largest employers. Second one is the contribution to GDP growth. Findings from various countries confirm the positive effect of ICT on growth – a 10% increase in broadband penetration is associated with a 1.4% increase in GDP growth in emerging markets. The third one is emergence of new services and industries. Numerous public services have become available online and through mobile phones. The transition to cloud computing is one of the key trends for modernization. Next effect is workforce transformation. New "microwork" platforms, developed by companies like oDesk, Amazon and Samasource, help to divide tasks into small components that can then be outsourced to contract workers. The contractors are often based in emerging economies. Microwork platforms allow entrepreneurs to significantly cut costs and get access to qualified workers. Last economic effect of ICT is business innovation. In OECD countries, more than 95% of businesses have an online presence. The Internet provides them with new ways of reaching out to customers and competing for market share. Information and knowledge have gradually become the necessary business resources that influence business management (Šilerová, Hennyeyová, Michálek, Kánská & Jarolímek, 2017).

Information and communication technology (ICT) is one of the key factors explaining growth differentials across countries. Investment in ICT contributes to overall capital deepening and therefore helps raise economic growth. Rapid technological progress in the production of ICT goods and services may contribute to more rapid growth in the ICT producing sectors. The greater use of ICT may help firms reduce their costs, enhance their productivity and increase their overall efficiency, and thus raise economic growth (Moradi & Kebryaee, 2009). The usual objective of an ICT impact analysis is to examine the relationship between ICT and productivity, economic growth or employment. The analysis usually includes other determinants such as labor, non-ICT capital and, for firm-level studies, factors such as firm characteristics, skills and innovation and employee education. There is necessary to focus on increasing of digital skills of employees in context of increasing the economic growth in European Union (Polakovič, Hennyeyová & Slováková, 2016). Included in ICT are the ICT-producing sector, often split into manufacturing and services, and ICT diffusion, measured by ICT investment

and/ or use. Productivity measures relate a measure of output (gross output or value added) to one or more inputs. Economic growth is usually defined in terms of change in gross domestic product (GDP) or value added. Employment refers to jobs generated through the direct and indirect impacts of ICT (Measuring the Impacts of Information and Communication Technology for Development, 2011). The positive effects of ICTs on economic growth have been confirmed by some studies and researches across the OECD and the European Union (Edquist & Henrekson, 2004; Hanclova, Doucek, Fischer & Vltavska, 2015; Falk & Biag, 2015, Tóthová, Országhová &Hornyak Gregáňová, 2017).

2   Data and Methods

There are some methods and indexes how we can measure impact of ICT on economic growth. One of these indexes is Networked readiness index (NRI). Networked readiness is a key indicator of how countries are doing in the digital world. Another definition can be that this index measures the propensity for countries to exploit the opportunities offered by information and communications technology (ICT). The NRI seeks to better comprehend the impact of ICT on the competitiveness of nations. The NRI is a composite of three components: the environment for ICT offered by a given country or community, the readiness of the community's key stakeholders (individuals, businesses, and governments) to use ICT, and finally the usage of ICT among these stakeholders. Also it is a composite indicator made up of four main categories (subindexes), 10 subcategories (pillars), and 53 individual indicators distributed across the different pillars. About half of the 53 individual indicators used in the NRI are sourced from international organizations. The main providers are the International Telecommunication Union (ITU); the World Bank; the United Nations Educational, Scientific and Cultural Organization (UNESCO); and other UN agencies. The hard data are convert into a 1-to-7 scale using linear transformation to be consistent with the data from the Executive Opinion Survey, using the formula:

$$6 * \frac{(Country\ Value - Sample\ Minimum)}{(Sample\ Maximum - Sample\ Minimum)} + 1 \quad (1)$$

The sample minimum and sample maximum are, respectively, the lowest and highest country scores in the sample of economies covered by the GCI (Global Competitiveness Index). The index was developed 2004.
Next index is the ITU ICT Development Index (IDI). The ICT Development Index (IDI) is a composite index that combines 11 indicators into one benchmark measure. It is used to monitor and compare developments in information and

communication technology (ICT) between countries and over time. The main objectives of the IDI are to measure:

- the level and evolution over time of ICT developments within countries and the experience of those countries relative to others;
- progress in ICT development in both developed and developing countries;
- the digital divide, i.e. differences between countries in terms of their levels of ICT development; and
- the development potential of ICTs and the extent to which countries can make use of them to enhance growth and development in the context of available capabilities and skills.

The Index is designed to be global and reflect changes taking place in countries at different levels of ICT development. It therefore relies on a limited set of data which can be established with reasonable confidence in countries at all levels of development. The IDI was developed in 2008 and the scale is from 0 to 10.

Indices bring together different indicators to provide a more comprehensive picture of what's happening than one indicator could do on its own. A good index will even out anomalies between these indicators. It will help us to compare countries with one another, and to understand trends over time.

3   Results and Discussion

According to the World Economic Forum's Global Information Technology Report 2016 Europe is the most technologically-ready region of the world. Seven of the top 10 countries were in Europe, including Switzerland, Scandinavia and most of the United Kingdom. The United States placed fifth, behind Singapore, Finland, Sweden, and Norway. Although Europe had a strong showing at the top of the list, it also has one of the widest disparities, with Greece taking 70th place and Bosnia and Herzegovina coming in 97th. Situation in Europe generally shows Figure 1.

Figure 1 **Networked Readiness Index in Europe countries in 2016**

Source: https://widgets.weforum.org/gitr2016/.

Slovakia is usually compared with neighbouring countries like Czech Republic, Poland and Hungary – these countries are members of the Visegrad Group (V4) also. Reason is that these countries have similar economic, political and cultural development. Comparison of these four countries shows Figure 2.

Figure 2 **Networked Readiness Index in V4 countries**

Source: The Global Information Technology Report 2009-2016, own processing.

Slovakia is below of the rest three countries. The causes may be several. Although the results of the survey suggest that Slovakia is moving towards to better results, political and regulatory environment is one of the weakest in the long-term. The

problem is mainly the efficiency and independence of courts or the lower quality of ICT-related laws. Weak government support for these technologies, the lack of long-term vision and the inefficiency of government services to citizens can also be the cause of such a placement in the rankings. The weakness is also the procurement of advanced technology, the quality of the education system as a whole, and the schools of management especially.

On the other hand, Slovakia's situation is better in the use of home computers, home access to the Internet and access of schools to the Internet. The strength is the use of the Internet in business towards the consumers. The problem in business is rather low rate of innovation and little impact of ICT on the development of new products and services. The value of individual index components in 2016 in more detail is shown on Figure 3 below.

Generally, in 2016, The Slovak Republic is one of the two biggest movers in this year's NRI, climbing 12 ranks to 47th place, mainly on the back of reinforced effort from the public sector: although the country ranks fairly low in the regulatory environment (its lowest ranks overall are in this category), it is starting to catch up this year in terms of the effectiveness of law-making bodies, laws relating to ICTs, and judicial independence. Furthermore, the government is perceived to have been more active in procuring advanced technologies as well as putting digital technologies to use to increase government efficiency.

Figure 3 **NRI of Slovak Republic in 2016**

Source: The Global Information Technology Report 2016.

In case of the ITU ICT Development Index (IDI), which is a powerful tool for monitoring progress towards a global information society, is the ranking of Slovakia very similar as NRI. Generally, the IDI has set a global average value of 5.11 in determining the annual index country rankings in 2017. Most of the European countries have exceeded the global average, placing them on the top half of the rankings. Iceland leads with 8.98, while Switzerland boasts 8.74 points. The United Kingdom is also a top contender for ICT development, having shown the most improvement from 2010 to 2017. In the Middle East, the oil-rich states have achieved significant IDI values. The connection between income and ICT development is one factor that figured in improvement and a reason why African countries have lower IDI numbers. Position of European countries generally shows Figure 4.

Figure 4 **The ITU ICT Development Index (IDI) in Europe countries in 2017**

Source: http://www.itu.int/net4/ITU-D/idi/2017/index.html#idi2017map-tab.

Comparison with the V4 countries is shown on figure 5. From the V4 countries is the Czech Republic above of the rest countries. Slovakia and Hungary has almost the same development line. In 2017, ICT Development Index had all four countries around number 7.

Figure 5 **ICT Development Index in V4 countries**

Source: Measuring the Information Society Report 2010-2017, own processing.

Slovakia's profile according the Information Society Report in 2017 is evaluated as a country with a highly competitive mobile market, with affordable prices for mobile-cellular and mobile-broadband services. The fixed voice market is still largely dominated by the incumbent operator and penetration rates are comparatively low. Most of the population is using the Internet and policies are in place that aim at further increasing competition in the mobile markets and access to and use of broadband networks.

4   Conclusion

The level of indexes indicates to what extent information and communication technologies affect economic and entire society growth in a particular country and to what extent individual countries can absorb the benefits of using information and communication technologies for economic growth and socio-economic benefits. When comparing various indexes and criteria, the weakest link in the chain appears to be the public sector. Slovakia lags behind in areas like enforcement of the law and public procurement of advanced technologies where it ranks among the least progressive not only in comparison with other European countries but also in global rankings. Slovakia's competitiveness to other countries can be summarized into four problematic areas: inefficiency of the public administration, human capital, market environment and infrastructure. At the end of this paper we can state that, the growth potential of the ICT sector is of the utmost importance for the entire Slovak economy.

Acknowledgements

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EXPERIENTIAL EDUCATION IN SUBJECT DESIGNING OF HERBACEOUS PLANTING

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Abstract

The aim of the paper is to present the reasons of application the experiential education strategies in subject ´Designing of herbaceous planting´. The long-time experiences with implementation of ICT on Department of Planting Design and Maintenance progressively had stagnated effect on volume of permanent and ephemeral knowledges. The effective and complex knowledges could be obtained through student teams cooperation on solving real project, research and development assignments, individual strong skills and creativity and interactions of knowledge acquired through experiential learning strategies.

Key words: *education, evaluation, experiential, ICT, planting, project, strategies*

JEL clasification: *A22 Undergraduate*

1   Introduction

The subject ´Designing of herbaceous planting´, and its teaching approach has every feature of design studio. The aim for educators of any art and design studio classes could be to help students develop as creative individuals, and to prepare graduates to think creatively at work, in personal life, and in society (Sawyer, 2017).

The subject ´Designing of herbaceous planting´ currently use traditional model of pedagogies, where curriculum and subject matter are structured and predefined. Student acquire set of design knowledge and then its demonstrate. Instructors use a teacher-centered approach, where a teacher present information as the expert, through traditional lectures. Obtained information from lectures are

permanented through engage student actively in creative work under guidance of instructor. Instructor is focused on grades or quality of the final work and final paper based-test as a feedback of obtained knowledge (qualitative measurable learning outcomes).

1.1   Information Database for ´Designing of herbaceous planting´

The aims of educators of Department of Planting Design and Maintenance during the last decade was to create and fulfil LMS Moodle environment with interactive study materials. The application of LMS Moodle in education increased the actuality of the presented information, increased ability independence learning and possibility learning over the prescribed course syllables (Hillová, 2016). The e-learning tools brought many benefits to the education process. One of the most important is the possibility graduated through distance learning, especially used by Erasmus students, or by students with health barriers that do not allow a certain part of the practical learning to be attended. Based on the questionnaire survey (Hillová, 2016), could be state the students' positive attitude towards the e-courses and formulate the following conclusions:

- LMS Moodle is generally perceived as a suitable environment, intuitive and easy to use,
- frequent logging into the e-courses (several times a week) leads to its successful graduation,
- students mostly studied nearly 100% of electronic materials placed in the course,
- the e-courses are generally perceived as necessary tool for successful graduation
- students would be able to, or at least partially, graduated after self-studying only from an e-courses

Some form of negative attitude towards LMS Moodle is related to the historical development of the environment of management of electronic courses (Šemeláková, 2008; Tóthová, 2016) and technical support flaws.

Through LMS Moodle during last ten years was created informational database for subject ´Designing of herbaceous planting´. Increasing quantity presented information and its need to memorize and demonstrate is considered by current student (which grow with ICT technologies) as an irrelevant for their lives. Therefore, to provide adequate theoretical knowledge is only one side of education process. Memorize and recite the deposited information as indicator of knowledge acquisition and academic success in tradition model of pedagogies are for many students lose the impetus to learn (Breuning, 2017). On the other major side student need practical skills and the ability to apply theoretical knowledge in practice and the develop of creativity (Rohaľová, 2000).

1.2 Experiential learning method - ´Interactive Experimental Garden´

Education, as a component of qualification, is related to practice and ability to use the appropriate information, skills, abilities, solutions to specific professional problems, daily work tasks, but also to understand and positive development of formal and informal relationships at a workplace. For a university student, the practice can be a professional internship, work in an organization or a company, in a position corresponding to its future professional specialization, but also a practice of daily assignments, work on seminars, semester assignments, participation in department and faculty projects. It is important that to solve these problems the student could cooperate with top faculty, department and practice specialists (Rác, 2009).

The ´Interactive Experimental Garden´ is a response to lack of students practice in Horticulture and Landscape Architecture study program and associated student low competencies in organizing and managing professional activities in horticulture and landscape architecture. Lack of student practice were noted by not only university teachers, but even the students themselves, regardless of their previous experiences in secondary education. The main objective of the ´Interactive Experimental Garden´ is to respond to needs of practice and to create environment for increasing the qualification of graduates, to create a base of practice and research available physically and online (Hillová & Šajbidorová, 2016).

2 Application of experimented schooling method

Experiential learning includes problem-based learning, project-based learning, student-directed learning, and active learning among others. The aim of this paper is to investigate the impact of introducing experiential methods on evaluation of final exam. Key research questions were as follow:

- How affects the way of the knowledge gains the final exam result?
- How affects the type of critique the graduation of subject?
- How affects the type of cooperation the graduation of subject?

The research was carried out in *Slovak University of Agriculture* in Nitra, *Department of Planting Design and Maintenance*, within the landscape architecture bachelor program, in *Designing of herbaceous planting* subject, during winter semesters of the academic years 2016/2017 and 2017/2018.

2.1   Experimental design

As stated above, subject ´*Designing of herbaceous planting*´ is based on large information database through LMS Moodle with lack of practice. Therefore, three simple changes in pedagogy have been made. As known generally in design studio the alone student works with one single tutor in execution of student project with single critique conducted between a student and a tutor (Ciravoğlu, 2014). The first change was related to participation student team on student work. The second change was conducted through multiple critique, and the last change was through implementation 5-day active practice to traditional learning (in object ´Interactive experimental garden´).

2.2   Results and discussion

The experimental teaching method within the subject ´*Designing of herbaceous planting*´ brought surprising results. The students involved to research had possibility two way of gained knowledge: through large information database set in LMS Moodle and 5-day active practice. During 5-day active practice, the students had been ensuring the preparation of plant material for planting, located the plants on the site according to the planting plan and planted the plant material. The final exam contained questions related to theoretical knowledge and practical skills. The null hypothesis: there are no differences in the way of knowledge gained and the final exam result, we do not reject. The observed difference of final exam rating (2,64-2,38) is not convincing enough to say that the difference between the ways of knowledge gained differ significantly (table 1).

Table 1 **The awarded grades of final tests with different gained way of knowledge**

t-Test: Two-Sample Assuming Unequal Variances	Awarded grades after demonstrate Knowledge obtained through practice	Awarded grades after demonstrate Knowledge obtained through information database
Mean	2,647058824	2,382352941
Variance	1,386809269	1,334224599
Observations	34	34
Hypothesized Mean Difference	0	
df	66	
t Stat	0,93569881	
P(T<=t) one-tail	0,176419716	
t Critical one-tail	1,668270514	

t-Test: Two-Sample Assuming Unequal Variances	Awarded grades after demonstrate Knowledge obtained through practice	Awarded grades after demonstrate Knowledge obtained through information database
P(T<=t) two-tail	0,352839432	
t Critical two-tail	1,996564419	

After implementation team work and multiple critique by the 4 juries' teacher together, 100% graduation of subject was achieved, and awarded better grades, too. The result suggests the more responsibility and accountability of students in sharing team project. Individual work with one single executive tutor reached only 76,5% graduation, and lower awarded grades, too. The observed difference of awarded final grades of subject (4,74-3,5) is convincing enough to say that the difference between the type of critique and cooperation on student work differ significantly (table 2).

Table 2 **The graduation of subject with different schooling method**

t-Test: Two-Sample Assuming Unequal Variances	Awarded final grade under condition Individual work under one tutor	Awarded final grade under condition Team work and multiple critique
Mean	4,735294118	3,5
Variance	1,109625668	2,769230769
Observations	34	40
Hypothesized Mean Difference	0	
df	67	
t Stat	3,870383526	
P(T<=t) one-tail	0,000124444	
t Critical one-tail	1,667916114	
P(T<=t) two-tail	0,000248887	
t Critical two-tail	1,996008354	

3. Vision of implementation the Creative teaching

The educators of Department of Planting Design and Maintenance try to find the effective model of creative teaching. In the first stage of development subject ´Designing in herbaceous planting´ was put priority on create information database set

on LMS Moodle. In the second stage will be focusing to help student develop their creativity by flexible, open-ended and improvised pedagogy.

Systematic review of Keith Sawyer (2017) in topic Teaching creativity in art and design studio classes identified approaches of creative teaching and learning that could be possible apply in subject ´Designing in herbaceous planting´:

- the curriculum and subject matter not to predefine, but rather to develop along with the student creative work,
- to use learner-centered approaches,
- to change hierarchical interaction between instructor and student to cooperative interaction (instructor could not be overly authoritative, but collaborative – lead, elicit, guide, encourage student work),
- to change instructor' focus from the final work to creative process, because the process is important learning outcome (OECD, 2008; Sawyer, 2017),
- to develop students' abilities to analyse, evaluate and improve their own work,
- to reduce students' focus on grades: to change paper-based testing to the communication about one´s work,

One of the possibilities of application this vision is to use real and online platform of ´Interactive Experimental Garden´. This real platform could to model how perform a role as a professional creative – for example, how to think and work like landscape architect, plantsmen, nurseryman or landscape contractor. Also, it could be learning to communicate about one´s work, respond to feedback and alter one´s practice, to cope with pressure (Sawyer, 2017). The same attributes must be applied in online form of IEZ, it not could to be a database of information, but path to the discovering and experiencing.

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DEMONSTRATIONS OF THE BEST PRACTICE OF E-LEARNIG IN THE SUBJECT OF QUANTITATIVE METHODS FOR MANAGERS IN THE DAILY AND EXTERNAL FORMS OF STUDY DONE BY THE ATTENDANCE, DISTANCE AND COMBINED METHODS OF EDUCATION

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Abstract

The paper is a demonstration of the best practice of e-learning in the subject of Quantitative methods for managers in the daily and external forms of study done by the attendance, distance and combined methods of education. The goal of improving the quality of higher education is to bring different forms of study closer to content. Based on my own experience, I know it is possible. But only with motivated teachers, technically talented teachers using electronic tools appropriate for a specific subject on the sustained LMS platform, but especially with the necessary institutional support of top management. This paper describes the system of work while applying the most demanding subject in Moodle. The course is intended for both students of the day-to-day full-time study method and for students studying via a distance method. The platform of the subject is also used by students of both branches of the School of Management - in Trenčín and Bratislava.

Keywords: *E-learning, E-course, Distance method of education, LMS – Learning Management System, Webinar, QMM - Quantitative methods for managers*

JEL Classification: *I23, I24*

1 Introduction

There are teachers who cannot imagine a teaching process without modern tools. There are also those who are afraid of them, and they deliberately prevent their usage. I belong to the first group, and I am lucky that the institution I work for does not only support this approach but also requires it from all teachers. E-learning has had a long tradition in the School of Management in Trenčín. Almost since its inception, e-learning has been a full-fledged form of teaching (Dávideková & Hvorecký, 2017). The paper presents examples of good practice in teaching selected topics from operational research. Operational research is taught at most universities in the world. It is found in the study programs that focus on agriculture, industrial production, ICT, services and public administration. That is why we chose it as the subject of our research. There have also been more than fourteen years of experience of the author in teaching via e-learning.

2 Course information and organization of study activities

The course (subject) "*Quantitative methods for managers*" (QMM) thematically covers two areas of operations research: queuing systems and linear programming. These include the third area of quantitative methods - time series (similar to the content of a similar subject at City University of Seattle) (Melicheríková & Bušíková, 2012). The course draws on the sources: JABLONSKÝ, J. 2007. *Operational Research: Quantitative Methods for Economic Decision Making*, PACÁKOVÁ, V. et al. 2009. *Statistical Methods for Economists* (Mandatory Resources). Optional sources include: BREZINA, I. - PEKÁR, J. 2014. *Operational Analysis in Business Practice*, HILLIER, F. S. - LIEBERMAN, G. J. 2010. *Introduction to Operations Research*. 9th edition, PLEVNÝ, M. - ŽIŽKA, M. 2010. *Modeling and Optimization in Managerial Decision Making* (Janošcová, 2018).

The target group of the e-course is represented by the students of the School of Management, studying in the daily form of study, who, based on the guidelines of the study counsellors of the School of Management, can choose by which method the given subject will be provided. Under certain internal rules of the School of Management, students choose the subject taught by the attendance method, or the "online" subject which is taught by a distance method and has standard e-course support in the open source LMS Moodle.

The E-course is part of the e-learning system of the study program "Business Management" in the field of study "Economics and Business Management". The entrance to the educational environment of the School of Management in Trenčín is in Figure 1.

Figure 1 **LMS Entry Gate and distribution of e-courses to categories**

The "Online Center Administrator" job is created to manage the e-courses. All the e-courses for all the School of Management courses (both in daily and in external form for both branches) are regularly updated, and after the end of the trimester,[1] they are backed up and stored in the archive. There is a specific amount of time (two trimesters) in which the archive is available to the teacher. Subsequently, e-courses go to the "Scrap yard", where they will be deleted after a certain time. The subjects for the following trimester are recovered from the backup in the "Preparation".

This system provides the maintenance, reusability and sustainability of the online education system of the School of Management, which is very extensive (it contains cca 160 different e-courses per trimester). The e-course is divided into 10 blocks, each for one week of the trimester.

The teachers can have a separate e-course for each combination of learning, for example, for students / external students, for students from Bratislava /

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[1] A trimester represents 10 weeks at the School of Management, during which the student can enroll for the maximum of 4 subjects (5 credits each). In one academic year, there are 3 such trimesters, and in the summer it is also possible to study, but only through a distance method.

Trenčín, for those who have chosen to study the subject separately through a distance method, and so on.

The e-course QMM is used by students at the same level of study (Master's), but from both branches studying in the daily form via both methods - both full-time and distance[2]. The necessary section is implemented by placing students into groups (BA, TN, daily[3], online). In Figure 2 there is the name of the merged course in one e-course ("*Zima 2018 [BA + TN: ... [daily + online]*").

The range of the subject matter previewed in the syllabus of the subject is fully covered in this e-course. This is especially because it is required to have an electronic support for the students of the distance method.

The educational goals (learning objectives) are summarized in the syllabus, divided and then inserted into individual learning blocks in the sense of Bloom Taxonomy (Hvorecký et al., 2015). Each topic has a tutorial in various forms. In the practical part, most of the examples from the required sources are processed in MS Excel, which contains a clear commentary and formulas for a better understanding of the results of the solution mentioned in the sources.

Their range varies from theme to subject, but does not exceed five spreadsheet sheets per topic or problem solved. The explanation of the theory of each topic for each week has a tutorial in the form of video-conductions, created in the multimedia studio in Trenčín[4], as well as created with the support of *Office Mix* (2017). This tool allows splitting longer video lectures into smaller parts that are acceptable to students.

Figure 2 **Merged e-course MC 506s at the LMS**

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[2]   At the School of Management, instead of the term "distance ...", "online" is a common name for historical and marketing reasons.

[3]   In the jargon of the School of Management, "day" means an attendance method for full-time study.

[4]   The studio was created with the support of the ESF within the project "Recovery and building of technical infrastructure for research and development of adaptive e-learning methodologies", ITMS code: 26210120030.

The calendar alerts students to different dates of activities (assignments, forum submissions, tests, etc.) and greatly helps organize the study, which is especially important while using the distance method. In case of a merged e-course, the syllabus for both methods is in the opening block. The standardized syllabus provides basic information on the subject, academic ethics (Kročitý, 2017) and a timetable with specific dates.

The Webinar is a tool that allows a regular teacher contact with students studying distance but is also suitable for "day" students who cannot attend classes, whether due to disease, representative duties, or similar reasons. A great help for the students of both methods are the recordings of the past webinars, placed in the "Online Support" block.

3   Course implementation

The QMM e-course uses LMS Moodle v. 3.1, in an online form. In 2017, migration from LMS Moodle 1.9 took place, as well as migration to a new, more powerful server, with both systems running for the year. The structure of the QMM e-course is in line with the standardized "template" of the School of Management, the minimum content structure of which must be observed by all teachers (so far only in the distance study). There is a minimum number of media sources (custom videos, online support files, audios, video clips, hyperlinks, etc.).

The e-course QMM also exceeds the minimum standards because it requires an emphasis on understanding quantitative methods rather than memorizing them (Figure 3).

Figure 3 **Structure of QMM in accordance with the template of the online study**

4   Activation of students

The e-course QMM combines the elements of both synchronous and asynchronous communication. Synchrony is ensured by the possibility of gradually making the content prepared visible in accordance with the timetable and the syllabus, as well as the terms for the fulfilment of different tasks and the terms of regular webinars (online consultations) for distance students. Many of the well-known e-learning tools are used by the students studying via a full-time method: sharing electronic materials (lectures, examples, case studies, task assignments), electronic tests with random choices of different types of questions (including self-assessment), polls and teamwork. Distance students use, in addition to these tools, constructive forum discussions and webinars, which are an interface between the classroom and the e-course (students meet a teacher at the same time from different places). Some tools are shared by both "day" and "online" students, even collaborating on some activities, thus enriching each other.

The subject is a balanced number of activities in which students work in a team (for example, structured forums) and activities aimed at practicing individual skills (practical assignments in MS Excel, etc.).

5   Conclusion

At the end of each semester, students evaluate the e-course. Here are some of their views on this e-course (Janoščová, 2018):

Table 1 **A survey of students' views on the QMM**

Which moment did you like best?	Which moment was the most annoying?	What helped you most in communication?	Which event surprised you most?
The first virtual class[1] .	Problems connecting to a net meeting.	Initially, the way I work in Moodle, but now I've already appreciated it, you just have to get used to it.	A webinar, which was totally new for me, and I think that was a great help.
I like the whole Moodle, mainly virtual lessons are perfect and help to master the curriculum.	When I got caught in my own inattention.	Fundamentally different-size classes on Moodle.	Online tests during the trimester.

Which moment did you like best?	Which moment was the most annoying?	What helped you most in communication?	Which event surprised you most?
Among the moments that I'm most interested in would be online tests :)	The very beginnings of Moodle work in the first week when I wanted to ask how to post a Moodle post on a Moodle question forum, but I did not find a way to add a post. But gradually, I tried to work it out - I just got it myself.	I find a webinar very helpful overall with the opportunity to ask questions and to get answers directly online, and I am very grateful to use this new, more efficient way of sharing knowledge, which really helped me to explain the problematic parts.	Webinars, I was probably the most surprised by them. I did not know what it was about, but finally I'm very glad! :-)
Overall, I'm interested in webinars that I consider to be a very effective way of teaching.	When I found out that the assignments would be about the same calculations in Excel :)) But it could be done!	Personal, voice contact in class, good teacher response.	I was pleasantly surprised by the webinar and then video recording and a lot of background to study - an electronic book and very well prepared presentations.

[1] Thinking – the webinar.

The outcomes of these students´ surveys make future work directions. Webinars have proved to be the most popular with the students. We want to explore the dependence of student success in the subject Quantitative methods for managers on their participation in the webinars. Another object of the research are online tests. Students use the self-assessment adaptive testing. In the future, we intend to examine the dependence of students´ achievements on the successful exams and final examinations on their success in the adaptive self-assessment tests.

The aim of improving the quality of higher education is to bring the forms of study closer to the content.

Based on my own experience, which is also described in this article, I know that it is possible, with motivated and technically competent teachers, to use electronic tools appropriate for a particular subject on a sustained LMS platform, but only with the necessary institutional support of the top management (Janošcová, 2017).

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THE BLOCKCHAIN TECHNOLOGY AS A NECESSARY TOOL BETWEEN CONTRACTUAL RELATIONSHIPS

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Abstract

The article presents objective argumentation of using the blockchain technology which is expected to become a core factor for future interrelations between companies and individuals. Whereas, there are lots of economists who still manifest skeptical view for blockchain technology to rely on. Nevertheless, involving more and more links in a whole supply chain creates a progressive growth in popularization of decentralized web-technology throughout whatever economies irreversibly. The bitcoin as the main product of blockchain technology has already been proving it year by year. Not only crypto currency but also concept of smart contract will contribute in future contractual relationships as a matter of trust.

Under the circumstances of mistrustful foreign currency, banks or mediators, the fear factor for cooperation all over the world will get much reduced as well as chances to be involved in unfair cooperation and interdependency. The aim of this paper is to present a basis of how blockchain technology works and give vivid examples of some sectors which have already succeeded in real practice essentially. Some assumptions and evidence in figures will be found. Also, there exist some barriers and difficulties for mass invention of this technology in common practice but certainly these obstacles will be inevitably eliminated over time.

The technology itself is under constant developing and those investing in developing information systems today will definitely gain tenfold back tomorrow.

Keywords: *blockchain technology, electricity price, fair trade practice, smart contract, supply chain*

JEL Classification: *L14, O31, D86, F23.*

1   Introduction

The term "blockchain technology" typically refers to the transparent, trustless, publicly accessible ledger that allows us to securely transfer the ownership of units of value using public key encryption and proof of work methods. The technology uses decentralized consensus to maintain the network, which means it is not centrally controlled by any company (https://www.blockchain.com/, 2018).

The technology is hard to imagine but as everything genius works simple. The information about any transaction or action records to simple digital block and then any further records are being added to the previous blocks that develops a holistic chain of blocks are recorded chronologically and publicly. All blocks are spread out between computer's net, and called chained blocks or as widely known - blockchain.

The most famous product of that technology is cryptocurrency the Bitcoin. As a result, the distributed continuous blocks which are being checked themselves between each other are almost impossible to re-record, to change, to steal or damage the information after the data has been accepted by all computers involved in the net. This is the biggest advantage of the technology and someone has called it 'the technology of truth'. Blockchain technology can also be applied to other types of uses. It can, for example, create an environment for digital contracts and peer-to-peer non-digital asset sharing like electricity power in energy supply chains.

Traditional intermediaries are no longer required in this model, as the other participants in the network act as witnesses to each transaction carried out between a provider and a customer, and as such can afterwards also provide confirmation of the details of a transaction, because all relevant information is distributed to the network and stored locally on the computers of all participants. This case we will try to look deeper in electricity market and make some assumptions on how potentially it is able to lead to whatever better effectiveness of functioning.

The blockchain acts by different way destroying centralized control of some energy serving companies and might allow the transactions are being processed in accordance with automotive electronic scripts, which execution will be ensured by the net itself. These contracts might include any terms, any objects and acts which are preliminarily agreed between participated parts. The difference is that all these terms and acts are agreed in an electronic form and without any intermediate between counterparts of agreement. As a result we can expect that meter operators, bank infrastructures, energy operating companies likely to disappear from energy supplying markets, as well as high service fees of middlemen. Although it is true that the blockchain net consumes some energy and resources but relatively far less than energy consumption and fees in existing models.

In the paper, we will present the functioning of electricity market as this is the most potentially prospective sector in blockchain technology among non-digital assets and try to find some evidences that blockchain is the necessary tool not only for that particular sector of the economy but potentially lucrative for the other markets in general and society as a whole. The market data is presented and projected on the example of the Slovak Republic.

2 Data and Methods

2.1 Digital algorithm of contract as element of trust

Due to the blockchain system is fully decentralised where all transactions being shared, executed and performed simultaneously in consequent chain it makes this technology potentially disruptive.

Nowadays, all participants realize obvious advantages of smart-contract application that runs and executes according to preliminary programmed script that corresponds to contract's agreement. Reduction of transaction costs as a result is the opportunity for even a small and weak company to get into a global market and make its presence beyond local territory with the help of smart-contract technology. Absolute trust between counterparts is not the only one that forces enterprises carefully study opportunities to invent smart-contracts in their activity. The IBM Blockchain resource [16] defines the benefits of supply chain with blockchain as:

- Reduce or eliminate fraud and errors;
- Increase customer and partner trust;
- Reduce delays of paperwork;
- Improve inventory management;
- Identify issues faster;
- Minimize courier costs.

2.2 Ecosystem of existence

In order to follow a contract by means of automation the contract should be in constant coordination with a real practice of agreement. For that, the smart contract gets the information from different digital sources such as indicators, sensors, devices and any other systems which are able to record and transmit an important data for each stages implementation of the contract.

Figure 1 **Cornerstones of a decentralized energy - transaction and supply system**

Source: www.pwc.com.

One of the brightest examples of such tuned smart system that involves peer-to-peer (P2P) energy distribution has already practically implemented in New York. According to www.brooklynmicrogrid.com (2016) [21], since April 2016, a pilot project run in Brooklyn has been discovering how to integrate buildings connected with distributed renewable energy resource systems such as solar panels in a decentralized peer-to-peer power grid. The rooftop photovoltaic systems installed on five of the buildings participating in the neighborhood project generate solar energy. The buildings do not consume themselves all energy generated but partially sold surplus of electricity to five other neighboring households. All buildings are interconnected through the conventional power grid, with transactions being managed, executed and recorded in the blockchain system. This example shows that local energy supplying system can successfully work autonomously within peer-to-peer territory with perspective to be grown.

Implementation of the project requires both smart meter technology and blockchain software with integrated smart contract functionality: smart meters are needed to record the quantity of energy produced, blockchain software is needed to effect transactions between the neighbors, and smart contracts are needed to carry out and record these transactions automatically and securely [2].

In the future, it is planned that the system can be controlled by means of an app that could be used to specify certain parameters, for example exact prices for electricity is to be sold among the neighbors. All transactions are then going to be executed fully automatically according to pre-agreed rules.

This approach are also mentioned (by Sun J., Yan J., Kem Z., Zhang K. 2016) [14] in describing the concept of blockchain-based sharing services what contributes into smart cities development.

Comparison of work models

Blockchain has the potential to change the way we arrange, record and verify transactions, with avoiding to rely on intermediaries (exchanges, trading platforms, trade and metering energy companies) towards decentralised business models where producers and energy consumers interacting directly. In fact, unlike the

financial and digital asset markets, the energy sector has a huge potential faster to be transformed on blockchain and take determinative role in 'things'. [3]

Figure 2 **The general concept of economic interactions in centralized and de-centralized electricity markets**

Centralized   De-centralized

Source: www.pwc.com.

Because of these significant differences in concept there is being modified internal processes within electricity supply chains as well.

Figure 3 **The difference in electricity supply chains**

Source: www.pwc.com.

3   Results and Discussion

The aim of this paper is to give a comprehensive overview of the current stage of use the blockchain technology, to present a basis of how blockchain technology

practically works and to give a vivid example of electricity sector which is the most potential in IoT (internet of things) for intensive developing [20]. To achieve this aim we bring a comparison of work models used up to day and present a case study of electricity supply chain in the Slovak Republic.

Practically, there is compered price forming policy for electricity per kWh in existing way and possible theoretical approach to form it in terms of alternative functioning the market in blockchain environment.

3.1 Electricity market price establishing

Market power refers to the ability of a market participant to raise prices profitably above competitive levels and lobby those raised prices for a significant time. Market power can exist in two forms - vertical and horizontal. Vertical market power can exist where a party controls two related products or services. In the electric power industry, a party that controls both electricity generation and transmission has the potential to seize vertical market power. An owner of generation has a financial incentive to exercise market power and manipulate prices directly related to the quantity of power sold into the market [8]. The power generation market is highly concentrated in Slovakia. The largest power generating company (Slovenské elektrárne) had a market share of 78.9% in 2011 [12] that is definitely considered as highly monopolized market.

There are two major market models: electricity pools and bilateral transactions. In Slovakia, trading takes place mostly through bilateral contracts. 10% of total annual power production in Slovakia has been traded on short term day-ahead exchange platforms [11].

A pool, or market exchange, involves basically a specific form of auction, where participants send bids to sell and buy electricity, for a certain period of time, to a market operator, who in turn analyzes the bids and calculates a market price that must be followed by all participants. In turn, bilateral contracts consist of essentially in direct negotiations around energy prices, volumes, time of delivery, duration, among other possible issues, between two traders. In terms of smart-contracts the set prices are very flexible since the negotiating parties can specify their own contract terms. Under mentioned terms, a power provider charges a price that is much higher than production costs, meanwhile buyers overpay for steady high price but stable by bearing all potential risk in electricity deliveries anyway. For example, Slovakia suffers from unscheduled electricity loop flows from Germany, threatening the secure grid operation and cross-border wholesale trade. Therefore, final consumers take also these risks their own.

Conceptually, a multi-agent system presents itself as a good way to interact between the members in order to ensure better energy security as a whole, to cut

transportation losses, to be able reinvest obtained incomes, saved from taxes and middlemen, to energy efficient local productions and developing territories.

The numbers of consumers switching power providers are increasing every year, which is a good sign for energy market liberalization. According to RONI (Regulatory Office for Network Industries in the Slovak Republic), switching was not beneficial in every case, as some power suppliers failed to set prices in a transparent manner. Irregularities related mostly to invoicing issues.

The picture with decentralized system under blockchain technology among generating power units has different working approach. For example, electricity power capacities communicate with computing electronic platform. In that model, market participants can submit offers to buy energy, or bids to sell energy, directly in a computerized marketplace. When a new bid is submitted, the software checks to see if there is a matching offer for the bid's period of delivery. In positive case, a deal automatically performs both the price and quantity are displayed to all participants. If no match is found, the new bid is added to the list of outstanding bids and remains there until a matching offer is made, the bid is withdrawn, or it lapses.

3.2   Transmission and distribution

The role performed by meter operators would change: they would no longer have to collect and record data themselves, as all consumption and transaction data would be exchanged automatically and accurately through blockchain technology (smart contracts). Such systems of smart metering in Slovakia are still being discussed. Distribution system operators install smart meters on a voluntary basis and usually it is about energy-intensive customers.

Horizontal market power occurs when a party controls a significant share of the market for a particular product [1]. The key players in face of wholesale and retail energy companies will be forced to leave the mediation function due to sharply reduced need. The number of licensed power retailers in the whole retail market has been constantly growing and it reached more than 400, also around 20 retailers provide electricity to household consumers [7]. Despite the growing number of competitors in the power supply market, prices for household consumers, small and medium companies remain strictly regulated.

The physical electricity controlled by the contract would continue to flow to the end user directly from the closest generator. Blockchain technology allows for direct contractual relationships to be established between energy consumers and energy producers. According to data, the Slovak Republic transits 9 622 539 mWh a year, where transit losses are 48 795 mWh, in turn cost of losses (tariff prescribed by regulatory agencies regulating) is 55,96 (Euro/mWh) that leads to overall losses around 2,73 bln.euro per year. (*Energy Charter Secretariat, 2014*).

Plus, to this numbers it is required to sum losses from solely domestic routes within points of production and consuming.

Table 2 **The structure of final electricity prices for households (VAT excl.).**

#	Type of payment	€/mWh
1.	**Commodity price**	**30-65**
2.	Fixed payment per client	0.65
3.	Fixed payment for connection to the grid	4,25*
4.	Distribution tariff	22*
5.	Tariff for losses (physical loss in grid)	8.3
6.	Tariff for system services (Voltage/frequency stability)	7.7
7.	Tariff for system operation	21.8

*- average in the range
Source: ENEL and ZSE, 2015.

Besides these 9 components, at company's electricity bill appears an additional item - "execution duty".

3.3 System fees

Table 3 **The structure in price forming for non-households in mWh**

Price structure per mWh	€/mWh	%
VAT	27.09	16.7
Cost of electricity gener., trans.& distrib.	108,72	67
Electricity tax:	**26.45**	**16.3**
Renewable subsidies	14.4	8.87
Cogeneration subsidies	2.8	1.72
Lignite mining subsidies	4.4	2.71
National Nuclear Fund contribution	3.2	1.97
Excise duty	0.5	0.3
Grid operator dividend	1.15	0.7

Source: http://iness.sk/ [17], modified by the authors.

There are revealed the aggregated content of electricity tax in the table above. Further, there is presented an each duty description in order to get clearer view

of the meaning each of them, and find a possible way to shorter these obligations due to relevant processes in a blockchain-based system.

Subsidies for renewables and co-generation – these subsidies are hidden under the term "system operation", they do not have much to do with that. These costs of environmental policy are not necessary for commercial operation of production, transmission and distribution of electricity.

Subsidies on domestic lignite power generation – these subsidies are used for keeping approximately 4,000 jobs in mines in central Slovakia that supply economically inefficient thermal power plant in Nováky [17]. It also constitutes a social policy and does not relate to electricity market operation.

National Nuclear Fund contribution (NNF) – The NNF collects funds for current nuclear power plants and any future decommissioning. In fact, it is paid by all customers for each consumed MWh regardless of whether it comes from photovoltaic cell or hydroelectric power plant and as a result it is paradoxically that renewable sources sponsor nuclear power generating and not on the contrary.

Excise duty– excise duty is the result of the EU's effort to transfer tax burden from labor to consumption and at the same time to create pressure to slow down the growth of electricity consumption. Slovak government introduced the tax without cutting down labor taxes and levies. Additionally, the tax administration costs and revenues are literally cancelling each other.

"Dividend" of SEPS – As the "natural" dividends of energy enterprises are not co-owned by the state directly but it is made artificially to increase profits of the controlled companies. As it is known, the grid operator SEPS, which administrates high-voltage network, is 100-percent owned by the state. Considering the average annual consumption of 28,500,000 MWh, consumers pay €1.15/MWh to the state as a "dividend" for each consumed MWh of electricity. If the state has not requested dividends from SEPS, it could lower the cost of the network operation.

3.4 Economic savings

In accordance with the information taken in sources and developed, it is possible to display the cost parts in a price with its shares in proper percent.

Table 4 **The composition of the typical electricity price per mWh on the market of Slovakia.**

#	Costs	Euro per mWh	%
1	Commodity price	44.02	27.13
2	Distribution	64.7	39.87
3	System fees	26.45	16.3

#	Costs	Euro per mWh	%
4	VAT	27.09	16.7
	Total	**162.26**	**100**

Source: Developed by the authors.

Under certain circumstances, in particularly, using the blockchain technology in electricity market supply chain there is a place for elimination of some levies, taxes and fees in case of multi-agent market. In considered models, there is proposed not to look at basic price forming part as "Commodity price" in both cases and agreed to take it by ceteris paribus.

Diagram 1: **The composition of typical electricity price in SR**

Source: the diagram formed according to *Table 4*.

Table 5 **Distribution fees which are potentially to be reduced or even canceled**

Type of payment	€/mWh
Distribution tariff (Transit)	22*
Tariff for losses (physical loss in grid)	8.3
Tariff for system services (Voltage/frequency stability)	7.7
Tariff for system operation	21.8

Source: Assumed by the authors.

These tariffs might be transferred to the zone of responsibility of independent power producer and are not included in direct electricity cost for consumers. Those sums are considered to be accounted by individual generating power unity and redistributed within household activity. The next mandatory fees under control of the state could be cancelled in accordance with supporting private power producers and included b y electricity generated unity itself for reinvestments.

Table 6 **The following taxes are expected to be revised.**

Type of payment	€/mWh	% of total price
Renewable subsidies	14.4	8.87
Cogeneration subsidies	2.8	1.72
Lignite mining subsidies	4.4	2.71
National Nuclear Fund contribution	3.2	1.97
Excise duty	0.5	0.3
Grid operator dividend	1.15	0.7

Source: Assumed by the authors.

In case of peer-to-peer transaction and terms of everything being equal the VAT-tax (20% in SR) as well as electric tax theoretically might be not included in mutual settlements. However, it depends on legislative regulations and state policy but nevertheless that is a ground to revise it in favor of power generating unit, in particularly and renewable energy policy in general.

Totally calculating theoretical benefits from using blockchain technology, we are able to potentially save costs. These saving are not supposed to be reflected in final price only whereas it might be re-distributed effectively through active contributors of green energy households among the country.

Let cost for generating is constant in cases with both B2B/C and P2P transactions, and Distribution tariff (transit) is invariable only in B2B/C chain, then:

$$PRICE\ potential\ mWh(B2B/C) = (PrP + PrD\ potential + SF\ potential) \times 1.2(VAT) =$$

$$= (44.02 + (64.7 - 8.3 - 7.7 - 21.8) + 0) \times 1.2 = 85.10\ euro/mWh\ (1)$$

Where:

PrP – Price of production, %
PrD - Price of distribution including retail margin, deviations etc., %
SF – System fees, %
Coefficient (VAT) – 20% of Value Added Tax in SR
B2B/C – B2B and B2C transactions

$$\Delta PRICE, \%(B2B/C) = 100\% - \frac{PRICE\ potential\ mWh, B2B(C)}{PRICE\ current\ mWh, B2B(C)} \times 100\%\ (2)$$

thus

$$\Delta PRICE,\% = 100\% - 52,45 = \mathbf{47,55\%} \qquad (3)$$

Equally

$$PRICE\ potential\ mWh(P2P) = (PrP + PrD\ potential + SF\ potential) =$$

$$= 44.2 + (64.7 - 22 - 8.3 - 7.7 - 21.8) + 0 = 48.92\,euro\,/\,mWh\ (4)$$

Where

P2P – transaction between individual households also known as peer-to-peer transaction

Therefore

$$\Delta PRICE, \%(P2P) = 100\% - \frac{PRICE\ potential\ mWh, P2P}{PRICE\ current\ mWh, B2B(C)} \times 100\% = 100\% - 30.15\% = 69.85\%\ (5)$$

It shows, that the current price for electricity might be potentially reduced by **69, 85%** or redistributed fairly among separate electricity individual producers and local micro grids they exploit in terms of using the blockchain technology and smart meters.

Properly, the price for mWh could also be lower by **47.55%** for non-households.

Our results coincide with some expert's opinions in the sector. For example, according to INESS (2015) [17], the electric tax elimination would reduce the price of electricity by more than €26 per MWh and therefore help to increase the competitiveness of the Slovak economy and increase the transparency of various policy costs.

4   Conclusion

As any other perspective technology it faces some basic reasons that do not allow growing too intensive in a business world. There are the basic ones which they meet in major cases:

- The public blockchain ecosystem allows anyone who wants to gain access to transactions on smart contracts in major are not acceptable to the business. After all, usually organizations are not willing to reveal their business connections, and even less are willing to open access to all their transactions.
- One another main obstacle remains a high entry fee. The programming of smart contracts is very expensive, and requires the presence of so-called code lawyers - specialists with a very rare combination of competencies.
- Puting metering digital indicators at each stage of contract procedure. That is exactly what is meant under ecosystem of existence. To measure in quantity feature the final stage of each milestone of agreement is crucially needed to

meter it digitally and create a mechanism of ensuring its stability, reliability and security of data. Nevertheless, an initial digital recording and further transmission the numerals to the blockchain system is still a hard discussed challenge that lies beyond this technology.

However, according to the greatest words of famous author there are three milestones of each good idea: 1. complete mockery; 2. violent denial and 3. acceptance as a necessity *(Arthur Schopenhauer).*

The abolishment of the heavy envies and taxes as well as unnecessary mediate part in a final price cannot be occurred without weight reasons for that, just because the beneficiaries of the system are not interested in changings. The blockchain technology potentially might be that specific reason for transformation energy sector towards prosperity of entire economy so as the energy sector is a primary factor for other industries.

However, in these assumptions there are lots of factors that could not be counted and also some features are still unavailable for a complete evidence of potential benefits. For example:

■ The blockchain technology consumes resources which are not usually taken into account but it does. The size of these consumptions depends on too many reasons which are not acceptable to discuss.
■ Second, it is assumed that price for the electricity is equal in both cases, but practically it is unlikely to be happened, when as widely known, the price from "green kWh" is usually higher.
■ Third, the government policy in taxation in particular and policy of economic support can be adapted to any current system as well, and this movement usually cannot be predicted in advance.

Nevertheless, this paper is making an attempt to describe the assumed situation and significant potential benefits when domestic electricity market will slowly move towards mass blockchain invention which irreversibly lead out to such or closely positive effect.

Acknowledgements

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INCREASING THE LEVEL OF MODERN EDUCATION IN THE SCHOOL ENVIRONMENT

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Abstract

We live in the world of information and communication technologies, which are used perhaps in all sectors including education. Modern education is an increasingly resonant theme in every society. The article presents the results of the analysis of the use of ICT in the education process at selected secondary school in Žilina. The main objective of this article is to increase the level of modern education in schools. In order to achieve this goal, we chose a quantitative method that helped us to identify the current state of this issue, the perception of modern education by students and teachers, as well as the gaps in modern education at that secondary school. Based on the current state of modern education, we conducted primary marketing research with the sample consists of students and teachers of selected secondary school. The data that form the basis of the analysis are obtained using an electronic questionnaire. The results of the research are then evaluated and analyzed to reveal the behavior of students and teachers in relation to ICT, the differences between students and teachers and the barriers that arise between them and technology. This approach has proved to be a powerful tool in analyzing the state of education at school and as a tool for increasing the level of modern education. The research results point to the need for continued attention to this issue in the pursuit of further development.

Keywords: *analysis, education process, ICT, marketing research, survey*

JEL klasifikácia: *I21*

1   Introduction

Modern education (Kremeňová & Fabuš, 2017) is an increasingly resonant theme in every society. Governments in many countries are making a lot of effort in developing strategies, studies, programs, projects, analyzes, surveys to help improve the country's education process. It is a necessary response to still more rapidly evolving information society and knowledge-based economy. Science, technology, new technologies are evolving. The education process (Tothová & Fabuš & Book Group Authors, 2015)has to keep the same pace in the order to promote development in other spheres of society.

The article presents the results of the analysis of the use of ICT in the education process at selected secondary school in Zilina. Based on the current state of modern education, we have conducted primary marketing research (Fojcíkova, 2017), which we can understand as sequential steps that are logically arranged and defined within the two main phases - the preparatory and the implementation phases. The results of this two phases are the subject of our article.

2   Data and methodology

2.1   Preparatory phase in the marketing research process

Marketing preparation itself precedes the preparatory phase, which consists of defining and elaborating the following parts.

2.1.1 Research problem, goals and assumptions determination

The marketing research process begins with a research problem formulation, which is the most complex step. In our article, we determined the main problem of marketing research - increasing the level of modern education at secondary school in Žilina. Based on individual responses of school students and teachers, we want to find out the state of education - level, attitudes and gaps of modern education.

Following the identified problem and using the theoretical backgrounds of the issue, we have defined three basic objectives of primary marketing research that can be achieved:(Soltes & Stofkova & Kutaj, 2016)

- identify the modern facilities of the school using modern didactic techniques,
- reveal the attitude of teachers and students to modern education,
- identify the level of use of information and communication technologies in the education process with the application of modern teaching methods.

Our objectives will serve as a basis for creating research assumptions that will be verified by the detailed analysis of the data obtained. The approximate determination of individual percentages in the following research assumptions is supported by the results of similar surveys conducted in the area of digital literacy or equipment of schools in Slovakia and abroad.

The working research assumptions of modern education based on interviews with experts were determined as follows:

P1: A maximum of 49% of respondents use the Internet everyday.

P2: At least 55% of respondents prefer modern education using modern methods and ICT compare to traditional teaching.

P3: A maximum of 52% of respondents gain new knowledge and skills on the Internet.

P4: More than 65% of respondents will think there is a need to innovate education process at a selected school.

2.1.2 Indicative analysis of the situation

In order to confirm the correctness of the assumptions and to decide whether it is really necessary to conduct the primary marketing research - we used an indicative analysis of the situation, which consists of the following steps:

- Description of the research problem - as has been pointed out in this article, the main problem of our marketing research is the increase of modern education at secondary school.
- Searching and analyzing of secondary data - from the secondary data obtained on the Internet, which we mention in the second chapter, we found that surveys in the area of modern education are realized not only in Slovakia but also globally.
- The final evaluation of the analysis - based on a detailed analysis of the secondary data, we find that there has not been conducted such a survey at this school.
- Determination of the information gap towards achieving the goals of the research - after the overall evaluation, we conclude that the available information will not help us to achieve the goals, nor solve the research problem. Therefore we need to consider the information gap as insufficient information, so it is also necessary to look at the fifth step of the situational analysis.
- Decision to conduct primary research - this is the ultimate step of the analysis that, on the basis of previous facts, decides to conduct primary marketing research at a secondary school.

2.1.3 Research plan

The last but important step of the preparatory phase process is to develop a research plan.

In following table are listed the characteristics of each specificity.

Table 1 **Research plan**

Type of research, type and sources of data	research: quantitative data: primary source: respondents
Method of data collection	Questioning
Data collection technique	questioning: electronical place of questioning: secondary school in Zilina
Size of research sample	Target file: 111 respondents The calculation is in diploma thesis (Fojcíkova, 2017)
Data analysis method	MS Office (Excel) – percentages graphical form
Role of researchers	processing of obtained data
Schedule	duration of the survey 06.02.2017 – 14.02.2017
Method of reaseach testing	questionnaire on a sample of 5 respondents

Source: Author.

The target group of the primary marketing research of diploma thesis are students and teachers who attend the selected secondary school in Žilina. We have obtained information about numbers from the internal school database listed in table 2.

Table 2 **Target group of primary marketing research**

Target group	Class				Sum
	1.	**2.**	**3.**	**4.**	
Students	84	115	86	103	**388**
Teachers					**37**

Source: Author.

As the basic method of collecting primary data, we decided to use the electronic survey consists of structured questions in the exact order that the respondent should answer.

2.2 Implementation phase of marketing research

This phase includes data collection and its processing.

2.2.1 Data collection

The collection of required data took place at the Zilina secondary school. We approached more than 111 respondents which is the minimum size of the research sample. We received 158 responses, each responding to our target group. 146 students and 12 pedagogues were involved in our marketing research.

2.2.2 Processing and analyzing data

To simplify the data processing we obtained from an educational institution, we used the statistical computing environment - specifically the Microsoft Excel spreadsheet. We have transformed the data to tables and processed it into graphs. These allow us to better express and examine the relationships between the variables and make a simple comparison.

3 Results and discussion

For questions characterizing the respondent - identification questions - we used pie charts. Evaluating the results of the research from the viewpoint of students in individual years, we have only mentioned some issues, given the scope of the article.

Question 1 - Gender

82% of female respondents and only 18% of male participated in marketing research dedicated to modern education at secondary school in Žilina.

Question 2 – Status

Out of the 158 respondents, 92% were students of secondary school. The remaining 8% were respondents who identified the teacher's answer.

Question 3 – Class

The largest proportion of respondents was fourth-class students (38%). The second largest group was students attending the first year (24%), the smallest proportion are students of the third grade (16%).

Question 4 – How often do you use the Internet in the education process?

Figure 1 illustrates the frequency of internet use in the education process from the point of view of students and teachers.

Figure 1 **The frequency of internet use in the education process**

Source: Author.

Research has shown that frequency of internet usage in education is different. While teachers are often referred to choice daily (5,70%), 44,95 students answered that they use internet for education just few times per week. There are also answers as few times per month what we may find as disturbing.

Question 5 –How long do you spend time on the Internet (daily)?
Spending time on the Internet is one of the indicators that tells us how our target group uses leisure time not only at school but also outside. The answers of everyday users are shown in the following figure.

Figure 2 **Frequency of daily use of the Internet**

Source: Author.

By research, we have shown that the percentage number of respondents gradually increased with the increasing frequency of internet usage and differences between students and teachers being significant. Up to 37,97% of respondents (students)

spend more than 5 hours a day on the Internet. The same number of teacher (1,90%) were recorded for time spent on the Internet less than an hour a day and 1-2 hours.

Question 6 – Assess the school's information and communication facilities

However, this indicator is largely influenced by the size of the school and its financial means. The following figure illustrates the overall attitude of respondents to the school's facilities with modern information and communication technologies.

Figure 3 **Level of school facilities**

Source: Author.

Figure 3 illustrates the fact that the school is predominantly equipped with good ICT facilities. Result of answer about computer facilities is good, which was marked by up to 84 respondents (53,16%). The high number of answers - 53 was also recorded in the very good option, which represents 33,54%.

Question 7 –Preferred type of education

Figure 4 confirms that students prefer modern ICT-based teaching instead of traditional teaching, which has also been shown in some of the previous figures. Most students (74,68%) prefer modern education, but research has also revealed those who prefer traditional education (17,72%). In the order to better indentify the preferred type of education, we focuded on processing the results of students studying in individual years.

Figure 4 **Preferred type of education in each year**

Source: Author.

The Figure 4 confirmed the fact that students of all classes are dominated by modern education before the traditional teaching. We have recorded several times higher numbers of respondents in all years except for the fourth, where up to 12,33% of respondents (students) prefer traditional education to modern ones. The lowest number of respondents in traditional education is in the third year, only 1,37% of respondents indicated this option.

Research has shown that a modern type of education with the application of ICT has a positive impact on the better memorability of the information amount from the lectured subject. Overall, 75.34% of students have that option.

Question 8 – What teaching methods are most commonly applied in the education process?

In order to increase the level of modern education it is necessary to apply modern teaching methods to the education process. The extent to which they are used at school is illustrated by the following Figure 5. In order to correctly formulate the question, we were based on theoretical knowledge, with each option being more detailed.

Figure 5 **Methods used in education process**

Source: Author.

Figure 5 illustrates the use of traditional and modern methods in the teaching process. The most commonly used method is the information-receptive method, which was identified by 124 students. We consider this method to be a traditional one. The second highest number of responses is recorded for answer discussion (70 respondents) and group work (59 respondents). A slightly lower number of responses are once again connected with traditional methods, such as problematic interpretation (46 respondents) and reproductive method (43 respondents).

Question 9 – How do you acquire new knowledge and skills in ICT?
The multiple choice question, which was presented only to teachers, helped us to discover how and through which they improve their skills and knowledge of ICT educators. About this fact, Figure 6 shows.

Figure 6 **Possibilities of Expanding Knowledge and Skills in ICT**

Source: Author.

In the statements of the teachers we see that they most often improve their knowledge and skills in ICT in a self-study environment. For the second highest number

of answers we can mark the training provided by the secondary school to increase the qualifications of our employees. A relatively high number of responses have also been recorded as cooperation with colleagues, and this type of knowledge enhancement is common in the workplace.

Question 10 – What do you think is the biggest problem at your school in modern education?

By research we have shown that the most problematic problem of modern education is the insufficient use of modern didactic techniques. Up to 27,22% of the respondents acceded to this option. There were also more problems with traditional teaching with insufficient application of modern teaching methods (20,89%) or insufficient skills of teachers and equipment of the ICT school. The smallest number of respondents experienced the difficulty of creating multimedia learning materials - only 5,06% of respondents identified this option.

The confirmation of these findings is also illustrated by the following picture, in which we highlighted the views of studetns and teachers on the subject.

Figure 7 **School issues in the area of modern education**

Source: Author.

The student´s greatest problem is the insufficient use of modern didactic techniques - up to 25,95% of studetns joined this option. The same percentage of students (19,62%) was noted in the possibilities of lack of equipment of the ICT school and insufficient skills of teachers in work with modern didactic technique. There were problems with the lack of leadership to innovate the learning process (6,33%) and the difficulty of creating multimedia learning materials, which was marked by at least students. Teachers consider the most common problem to be the traditional teaching - this option was marked by 3,16% of teachers.

Question 11 – In your opinion, there is the need to innovate the learning process - make more use of ICT and modern teaching methods?

Figure 8 tells us about the attitude of respondents in the secondary school to the need to innovate the learning process - to modernize it.

Figure 8 **The need to innovate the learning process**

Source: Author.

Through research, we have demonstrated the need to innovate the learning process and make more use of modern teaching methods and information and communication technologies. This opinion has 66,72% of students and 12 teachers (7,59%). Only 5,70% of studets has a negative option. As it is about teenagers, it is not surprising that 18,99% of them are not interested in the issue.

Results of primary marketing research

Based on the processing and evaluation of primary research results, we can verify the correctness of the assumptions that were defined in the preparatory phase of marketing research:

P1: A maximum of 49% of respondents use the Internet everyday. The research assumption was confirmed, as only 25.95% of respondents said they came into contact with the Internet everyday. This option was marked by 20.25% of students and by 5.70% of teachers.

P2: At least 55% of respondents prefer modern education using modern methods and ICT before traditional teaching. The research assumption was confirmed, as up to 74.68% of students and 7.59% of pedagogues prefer the modern type of education, which is 82.28% overall.

P3: A maximum of 52% of respondents gain new knowledge and skills on the Internet. The research assumption has not been confirmed, as 53.16% of students and 5.70% of teachers have been told to acquire new knowledge in the online environment, for example, through online courses or social networking services.

Overall, 58.86% of the respondents acceded to this option. We can verify the research assumption from the point of view of teacher who acquire and improve their knowledge on their own on the Internet.

P4: More than 65% of respondents think that it is necessary to innovate the education process at secondary school. The research assumption has been confirmed, as up to 75.32% of respondents (67.72% of students and 7.59% of teachers) believe that ICT needs to be used more and thus to modernize the learning process.

4   Conclussion

We can say based on the primary marketing research we have revealed not only the current level of modern education of the educational institution but also its gaps which the school should focus in order to proudly honor the modern, innovative, 21st century school.

Acknowledgment

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USING THE OFFICE 365 CLOUD SOLUTION IN THE EDUCATION PROCESS

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Abstract

In generalizing the Moore's law (1965) in relation to digital technologies and the increase of information in the digital space, it can be agreed with its claim that performance (and amount of information) doubles about every 18 months. In the article, the author deals with issues (and possibilities) of the cohesion technologies of cloud computing and e-learning of students. In the last two academic years, the subject of Software Project Management at Bachelor Degree is taught at the Faculty of Economics and Management. The subject graduates get the theoretical basics of project management, in the practical level they get work in MS Project. MS Project application is available for students in two versions: in a local version on a PC and in an on-line version of the Office 365 SUA cloud solution. Learning materials for the subject (in the first year of the lesson) were not processed in electronic form nor yet in the form of an on-line course in the LMS Moodle environment. There was a challenge ahead of us - to work out the electronic form of the subject in a short space of time, using the Office 365 environment and its services for that purpose. Another objective was to familiarize students with the possibilities and functionality of Office 365 services as a future work environment during the transition into practice. It should be noted that none of the students did not work before using the Office 365 environment and did not use any of its services. After completing the subject, the students completed an anonymous online questionnaire evaluating the teaching method used. Its results are an important feedback for improving the teaching of the subject.

Keywords: *cloud computing, Office 365, online services, e-learning*

JEL Classification: *L86, M15, O33, I25*

1   Introduction

A key component of a modern e-learning system is the software solution for learning management. Cloud computing in this area can also bring new capabilities and features and make it better. For subject teaching Software Project Management (thereinafter SPM), we used the Office 365 environment for organizing teaching during the semester (lectures, exercises), providing electronic study materials, collaboration of a teacher and study group, and individual student work. After the end of the subject, we conducted a survey, the results of the survey confirmed the suitability of the chosen learning method in Office 365 and OneNote. At the same time, they suggested the possibilities of enhancing the online teaching of subjects. Because the survey results confirmed some students' negative attitudes towards LMS Moodle, our goal was to explore the possibilities of linking LMS Moodle and Office 365 and eliminating these attitudes.

1.1   Cloud Computing

Cloud Computing is currently undoubtedly one of the main trends in the provision of Internet services. Its popularity and penetration into almost all areas of social life is undeniable. Working in the cloud has become essential for businesses of all sizes and across all industries. The decision to switch to the cloud is no longer an optional: it is a requirement in today's business-driven business scene.. In literary sources, there are many definitions of cloud computing. A wider definition defines cloud computing as a way of providing IT services (software, hardware) via hosting over the Internet in a dynamically scalable virtual environment (Hallová, Cloud computing – definícia, výhody a nevýhody, 2013). For the different approaches to defining cloud computing, common features are:

- defining cloud properties,
- defining service models,
- defining deployment models.

From the end-user perspective is cloud computing the ability to use various IT services, software, data, and hardware base in an environment of broadband networks regardless of location, time, and device used.

One of the key elements of cloud computing is the deployment model. In general, the deployment model defines the relationship between the hardware base of cloud computing (its ownership and administration) and the way the software is made available and ready for use.

Cloud computing deployment models:

- Private cloud - services are provided for the authorized users only of specific organization, due to the need to ensure a high level of security.
- Community Cloud - services are provided for many organizations that have common interests and which create a specific community (e.g., banks).
- Public Cloud - services are publicly provided to all users free of charge, or fixed price per use/per user over broadband network
- Hybrid Cloud - is a combination of private and public cloud where part of the services or applications (especially for processing sensitive business data) is provided in a private cloud.
- Service models define which IT component is provided as an end-user service models:
- Software as a Service (SaaS) - the user is provided software accessible by means of web browser or program interface.
- Platform as a service (PaaS) - the user is provided as a service to various IT platforms (operating system, application development tools, database tools).
- Infrastructure as a service (IaaS) - the user is provided with a hardware infrastructure, network resources, storage, and computing performance.
- Communication as service (CaaS) - the user is provided services such as web conferencing, videoconferencing, social media tool, instant messaging.

In recent years, we have witnessed the growing number of businesses and organizations that have fully or partially implemented their IT environment in the form of cloud computing. Expanding the portfolio of services and areas where cloud computing services are offered. According to Kačmár , the release frequency of new cloud products for end users is considerably shorter - the new functionality is available to users during the month after creation and testing.

1.2   Cloud Computing in the Learning Process

The Internet changes traditional models of learning that transfer from the traditional forms of learning to classes, classrooms and lecture rooms to the virtual space. The use of Information and Communication Technologies (ICT) in education makes it possible to focus on the student and the individualisation of education . These technologies have changed the philosophy of teaching and learning, the role of a teacher (from an informant to a counselor and a guide), the role of a student (from a passive recipient to an active learner), a standard system of subjects and the organization and management of education .

In general, the benefits of ICT in the learning process can be summarized as follows :

- ICT can offer content in a compelling and interactive form.
- ICT helps teachers to record and track the progress of each student's study.
- ICT allows personalized learning of educational material.
- ICT can build virtual social communities between educational institutions, teams of students and teachers.
- ICT facilitates learning to learn.

In the educational institutions environment, Learning Management System (LMS) solutions represent an electronic management system and learning organization within e-learning. An on-line training course creates a global virtual knowledge space and supports personalized learning for students. E-learning is an accepted way of teaching and using the global network in every education process. Ubiquitous learning integrates wireless, mobile and context awareness technologies in order to detect the situation of the learners and provide more seamless adaptive support beyond formal learning process .

Cloud computing is gradually becoming part of the e-learning environment of educational institutions. According to the authors cloud computing is an infrastructure that can bring a new value to the e-learning system, as educational services can be delivered in a reliable and efficient way. It also provides an appropriate environment for ubiquitous learning activities.

Driving cloud computing into e-learning is a reality. According to , private and public cloud models are predominant in relation to the existing infrastructure of universities. From the point of view of providing specific software applications and services predominates the software model as a service (SaaS) with user access through a web browser.

The researchers dealing with cloud computing in education process are also (Thomas, 2012), (Arkhipova & Zaytseva, 2013), (Smith, Bhogal, & Sharma, 2014), (Alamri & Quershi, 2015), (Rudy & Cassandra, 2016), (Almajalid, 2017).

1.2.1 Office365 in education process

Office 365 cloud solution for Education of Microsoft works on a software-based principle as a service, and is a vast platform of tools for communication, collaboration, processing, and sharing electronic documents and user workspaces. The main advantage of Office 365 is authenticated user access from anywhere and anytime. For the user, that first time sign in to Office 365, there are some interesting options, such as online versions of Office applications, OneDrive 1TB of storage and 50GB of email storage, 5 personal licenses for free to install MS Office

to your PC/notebook. However, this is the minimum of the features that Office 365 includes.

From the point of view of the education process are its benefits even more pronounced. The wide functionality of the services available along with the unified access of teachers and students creates a common space for learning and collaboration. The justification for its use in the education process of Salcito is defined as the move and a "game changer" for teaching and learning.

The issues of implementation and use of Office 365 in the educational process are dealt with by authors (Babin & Halilovic, 2017), (Carutasu & Pirnau, 2017), (Dredge, 2017), (Georgieva, 2017), (Pugin , 2017).

2   Data and Methods

Cloud solution Office 365 is available for SUAs for employees, teachers and students since 2013. Its use by employees and students does not have the character of mass use. The switch to use is optional on the user's own choice . This is a significant difference compared to other Slovak universities, where its use is automatic and obligatory (even in coexistence with the academic information system and its services). Office 365's statistics show that it used 175 users in 2016, at the end of 2017 329 users. Of these, there are 253 employees (77%) and 76 students (23%)[5]. Situation according to individual faculties and type of user expresses Table 1. Statistics indicate that users do not know how many features Office 365 offers and uses only one, up to two services (typically mail and storage).

Table 1 **Using Office 365 on SUA by faculty and user type**

User	FAPZ	FBP	FEM	FESRR	FZKI	TF	Other departments
Staffs	28	21	34	32	13	24	101
Students	17	12	10	15	0	22	0

Source: Author's processing.

From 2015, a new, obligatory optional Software Project Management is included in the catalog of faculty subjects. The subject was not processed in electronic form (for a short time) and because part of the practical lesson was the work with the online version of Project Office 365, we decided to use Office 365, its environment and services for that purpose. Based on the above facts, we have defined the following requirements:

- Analyze the possibilities of using Office 365 in the learning process.

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[5]   These numbers apply to users of the e-mail service, they do not use other Office 365 services

- Analyze the available Office 365 services and develop the design components that a teacher can use to improve and streamline teaching.
- Apply the elaborated proposal for the subject of Software Project Management.
- Handle the background material of the subject in the form of a digital blank book.
- Explore the possibilities of linking the LMS Moodle University e-learning solution to Office 365.
- Expand and popularize the use of Office365 among FEM students.
- Realize a survey among the students who attended the subject with the support of the learning process in Office 365.

3   Results and Discussion

The starting point for the teaching of the subject was the decision on the appropriate form of processing of its electronic form. It was necessary to choose a solution that would provide students with an online learning environment without access to other learning platforms (such as LMS Moodle), providing them with the necessary information and opportunities for online communication. At the same time, study materials must be readily available, with a simple option of processing and updating . The electronic version of the subject was processed in the ClassNotebook application as a digital notebook. We used the basic structure of ClassNotebook:

- Content Library - contains background material for lectures and exercises.
- Collaboration Space - is used for user collaboration, document sharing and organization of study (semester assignment, publication of test results).
- Personal workspace for student - designed for communication between individual student and teacher, we used it for "hidden" communication (semester work assignment and its processing, consultation, short tests).

Other Office 365 applications

The current version of Office 365 for SUA users includes 26 apps in the base suite, of which 24 is common to teacher and student. Most applications are automatically assigned to the user (after publishing in Office 365), for some applications (in our case Project), permission is granted by the Office 365 administrator. During the semester, students learned about the functionality of multiple applications/services that we distributed as follows:

- Office and Work Organization Applications

- Applications for online communication
- Applications for web and intranet
- Collaboration applications
- Applications for personal development and education
- Business applications

Office 365 and LMS Moodle

Electronic courses are available at LMS Moodle within the university. Our task was to explore the possibilities of integrating and linking Office 365 and LMS Moodle. This would make it possible to extend the room for learning and to eliminate students' negative attitudes towards some of the features of the LMS Moodle surveyed. The solution exists in the form of installing plugins in Moodle's LMS environment, which is the subject of further research in collaboration with the administrators of both platforms.,.

Survey and results

To obtain feedback from students and to evaluate the methodology used to teach the subject in Office365, we have developed a questionnaire. The questionnaire was spaced in the Forms application and sent to the students (a total of 32) after the end of the subject. The questionnaire was anonymous, filled in by 27 students, a return of 84.4%. It consisted of 16 questions which were structured into five thematic areas:

- Personal Respondent Surveys - own IT tools used, software used, language knowledge.
- Internet - usage reports for personal and educational purposes, service types used.
- The way of delivery and distribution electronic study materials.
- Learning with LMS support Moodle - its use, plus and minus.
- Training with Office365 support and OneNote application - evaluation of subject teaching with OneNote support, using other applications.

In the questionnaire we used basic descriptive characteristics and set several hypotheses. In the work, we present the OneNote and LMS Moodle teaching support hypothesis, *"It is for you to use and work in the OneNote/Moodle environment to benefit (in direct teaching on lectures and lectures for self-study,"* where we

studied whether students prefer one of tools. For student responses, we used the Likert Scale with the choice of 5 types of answers, the results displayed Figure 1.

Figure 1 **OneNote/Moodle as a benefit for teaching and self-study by students**

Source: Author's processing.

On the basis of the students' comments, we anticipated the OneNote preference and set the hypothesis H0 and H1.

On the basis of students' verbal expression we expected OneNote preference and we have determined the hypotheses H0 and H1. The aim of the paper is to retain or reject stated hypothesis:

Hypothesis H0: There are no differences in the evaluation of the lessons learned with the support of OneNote and LMS Moodle electronic tools. Students did not prefer any of these tools. From the point of view of the descriptive characteristics between OneNote and Moodle there are no differences in the medians.

Hypothesis H1: There are differences in the evaluation of subject-based learning with the support of OneNote and LMS Moodle electronic tools. Students in the evaluation preferred to use OneNote application. From the point of view of the descriptive characteristics between OneNote and Moodle there are differences in the medians.

Figure 1 shows that OneNote had better preferences in student ratings. Positive attitude in the OneNote assessment (yes, rather yes) was reported by 74% of students, for Moodle 56% of students. The negative rating (rather no, no) was only reported for Moodle - a total of 18%. Based on the basic descriptive characteristics (modus, median, mean) applied to that type of data it can be stated that students show division ambiguity. The modus shows a value of 3, so the most common answer was "I can not judge" (i.e. 26% of the students for both tools). The ambiguity of opinions is also confirmed by the median of 3 (50% of students reported positive responses and 50% negative responses). The results are shown in Table 2. A similar result is also indicated by data processing using the nonparametric Wilcoxon test in Table 3.

Table 2 **Evaluation of basic descriptive characteristics**

klasifikator	N Obs	Mean	Mode	N	Median
Moodle	26	2.6	3.0	26	3.0
OneNote	26	2.2	3.0	26	3.0

Source: Author's calculation.

Table 3 **From the results of the descriptive statistics by Wilcoxon Scores (Rank Sums)**

klasifikator	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
OneNote	26	626.0	689.0	46.752372	24.076923
Moodle	26	752.0	689.0	46.752372	28.923077

Source: Author's calculation.

We used the Wilcoxon Two-Sample Test to evaluate the hypothesis, the value of the test of 0.1813 confirmed the zero hypothesis - there is no significant difference between the OneNote and Moodle students' assessment (Table 4).

Table 4 **Results of Wilcoxon Two-Sample Test**

Statistic	626.0000
Normal Approximation	
Z	-1.3368
One-Sided Pr < Z	0.0906
Two-Sided Pr > |Z|	0.1813
t Approximation	
One-Sided Pr < Z	0.0936
Two-Sided Pr > |Z|	0.1872
Z includes a continuity correction of 0.5.	

Source: Author's calculation.

The Office 365 cloud solution for the subject was only recognized by 19% of students. For the benefit of use for personal/study purposes, the students stated the following: availability of Office 365 apps/services anywhere, anytime (25%), possibility of free installation Office 2016 (30%), storage for files and 50GB mailbox (19%). Interestingly is fact, that 27% of students, as a personal benefit reported

acquiring knowledge for future employment. Cloud solutions are the future of IT technology, and the use of Office 365 during study is a way for students to expand their ICT skills for the future. The reality of ordinary life is that employers require a certain level of computer skills in almost any job position and generally all academic disciplines today require computer skills.

Teaching the subject using OneNote application, the students evaluated positively. Figure 2 shows the characteristics that the students most appreciated in this way of teaching and distributing the documents and consider them to be important.

Figure 2 **Rated characteristics of using OneNote in teaching**

Source: Author's processing.

From the evaluation of other questions, we consider the following facts to be significant:

- The most used IT resource in the student's possession is a notebook, 79% of students use 2, respectively. 3 devices (notebook/tablet/smartphone). The reason for the survey is the ability to access OneNote applications and 15 other Office 365 applications using mobile apps on smartphone/tablet.
- There are significant differences in the use of the Internet (number of hours per week) for personal and study purposes. More than 30 hours a week, the Internet uses 56% of respondents for personal purposes and only 11% of respondents for study purposes.
- The use of LMS Moodle rated 63% of students as a benefit for their study, however, as deficiencies respectively missing elements: unattractive environment (29%), lack of online communication (25%), better orientation in courses (24%), quality of processed courses (16%).

The research has revealed several interesting conclusions that will make it easier to learn lesson not only in Office 365 but in LMS Moodle when it connects with Office 365 and LMS, which will enable the learning process to be improved for all existing courses and subjects in LMS Moodle. At the same time, they should be important in further research, addressing a larger number of students of different subjects, using other data acquisition techniques (interviews, teacher evaluation, etc.).

4   Conclusion

Office 365 with a wide application functionality is a powerful tool that can be used in the learning process. Experience has shown that the chosen form of teaching of the students' subject has been addressed, as reflected in their increased activity on lectures and exercises. Authors have said that education will be more personalized, collaborative, informal in the future, supported by flexible and dynamic virtual environments, and a range of tools to educate both within and outside schools. The solution used for the subject of the SRP meets the above attributes. Students have learned to work in a new way that integrates applications of a diverse nature into one unit and where information of a different nature is available. During teaching/self-study, they worked not only with OneNote, but also used communication, collaboration, and application processing applications. This form of cloud service and information is consistent with the authors' claims that understanding the work with information and its use as an activity represents an intellectual shift. An open question for solution is the integration of LMS Moodle and Office 365, which will provide SPU teachers and students with a modern learning platform to increase productivity.

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RELEVANCE OF INTERNET INFORMATION SOURCES ON BUSINESS FOR MANAGEMENT PROCESSES

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Abstract

Nowadays, quality of on-line information resources on businesses and their availability play an important role in managerial decision-makings, in order to ensure their compliance and flexibility. Internet as an on-line instrument of communication has greatly accelerated managerial decision-making regarding to the implementation of business processes. The aim of the paper is to analyze on-line sources of information available for managerial decision-making in Slovakia. The information the manager needs for their decision-making should be judged in terms of timeliness, reliability, relevance, completeness and clarity. An important feature of business information for external users, which may be managers of business partners or competing businesses, is their comparability. In the field of financial information in the Slovak Republic, the comparability is ensured by the legislation for the preparation and disclosure/presentation/reporting of the financial statements and annual reports of the enterprises in the Register of Financial Statements.

Keywords: *Information Sources, Register of Financial Statements, Annual Report, Financial Statements, Internet*

JEL Classification: *M40, M41, M10, M15*

1 Introduction

Business information available freely on the Internet in the current times of market economy and world globalization is of an increasing importance, which is reflected, inter alia, in the current process of European integration (MacGregor,

2012). It is not merely about finding out the existence or non-existence of a business entity, but rather about learning of its financial situation and economic potential, as well as other plans and strategies of the company and its approach towards corporate social responsibility (MacGregor, 2017). These questions are relevant not only as a focus of an economic research, but also serve as a basis for management economic decision making processes. This article deals with electronic resources available freely for everyone related to companies operating in the Slovak Republic. This includes, in particular, core business data, statutory financial reporting and financial statements, annual reports, as well as data analyzed from these primary sources through derived financial business indicators. In order to assess the relevance of this information, it is important to consider their readability, availability, and user-friendliness, which improves their applicability in the assessment of the economic situation of businesses (Turečková, 2015; Parajka, 2016). Information obtained from electronic sources helps to optimize R&D processes and improve their competitiveness. (Bočková, 2015).

2   Data and Methods

The aim of the paper is to analyze on-line sources of information available for managerial decision-making in Slovakia. Provision of financial and non-financial business information is assessed based on the legislation applicable to accounting entities and their statutory reporting duties and obligations. Based on the data and information disclosed in the Register of Financial Statements and other available Internet sources, we identify the nature of the information on business entities operating in the Slovak Republic, its form, and availability for all parties. Based on the statistical analysis of the Finstat database (Finstat, 2018), which obtains, updates, and subsequently handles information on business entities from the Register of Financial Statements, we compare the number of documents disclosed by accounting entities by their respective type for the accounting periods ending in 2012 and 2013 with the accounting periods ending in 2014, 2015, 2016, and 2017.

3   Results and Discussion

3.1   Accounting Entity General Information Available Freely on the Internet

Primary information on businesses registered in the Commercial Register of the Ministry of Justice of the Slovak Republic can be obtained from the website: *http://orsr.sk/* (CR of the SR, 2018). Search criteria include the business name,

identification number, headquarters, file number, legal form, names of shareholders, as well as other advanced search strings. It is possible to display the records by the time of their last update indicating any and all changes thereto with the respective date. In case of natural persons, entities with an assigned Company's ID ("IČO") with a business license can be searched in the Trade Register on the website *http://zivnostenskyregister.vyhladajsi.sk/* (ZR SR, 2018). In the Trade Register, it is possible to use the following search criteria: name, operation's address (municipality, street, number), and business name, IČO. Business entities can also be found in the list of debtors kept by the Social Security Insurance Company *http://www.socpoist.sk/zoznam-dlznikov-emw/487s* (Social Security Insurance Company, 2018) or Health Insurance Companies *http://www.dovera.sk/overenia/ dlznici/najvacsi-dlznici* (Dôvera, 2018), *http://www.union.sk/zoznam-neplaticov-pravnicke-osoby* (Union, 2018), *http://www.vszp.sk/platitelia/platenie-poistneho/zoznam-dlznikov.html* (VŠZP, 2018), or in other lists of companies suspected and blocked, whose VAT authorization has been terminated or suspended pursuant to the Vat Act for VAT unpaid thereunder *http://edane.drsr.sk/report/ds_dphz. zi* (eDane, 2018), or list of tax debtors (legal and natural persons) *https://www. financnasprava.sk/sk/elektronicke-sluzby/verejne-sluzby/zoznamy/zoznam-danovych-dlznikov* (Financial Administration, 2018). Search criteria in these list includes the birth number or IČO.

3.2 Financial Statements and Annual Reports Published in the Register of Financial Statements

Business entities have statutory duty to disclose economic information in the form of financial statements and annual reports on the website *http://www.registeruz.sk/cruz-public/domain/accountingentity/simplesearch* (RFS, 2018). It is possible to search for information in the Register of Financial Statements of the Ministry of Finance of the Slovak Republic (hereinafter the "RFS") by the name, accounting entity, IČO, Tax ID ("DIČ"). The RFS can be searched for a particular accounting entity and criteria selected, such as specific search strings of characters contained in the name, the number of employees, legal form, accounting year, type of the financial statement (regular, extraordinary), region, district, address of the establishment, accounting entities with consolidated financial statements only, accounting entities still valid by the date selected, or any combination thereof. The information available is in the form as it is submitted to the Financial Administration of the SR as part of the tax return for the income tax, as well as other supplementary documentation and amendments. (Pakšiová et al., 2016) Financial statements and other documents published in the RFS are submitted to the Financial Administration (in case of private sector entities) or through the

Treasury (in case of public sector entities). Neither the RFS nor the Ministry of Finance of the SR accept financial statements or other documents directly. The RFS was established on 1 January 2014, and - pursuant to Section 23 (2) of the Accounting Act - it reports information on accounting entities produced by 31 December 2013 and later. It is possible to search and display financial statements available on the RFS and other documents listed therein, and it is possible to save and print financial statements and other documents.

The RFS was introduced to improve and simplify the business environment and reduce the administrative burden (Parajka, 2012). At the same time, it is aimed at improving the availability and quality of information on accounting entities. It was established by Act 431/2002 Coll., Accounting, as amended, and it serves the function of public administration information system, operated by DataCenter under the authority of the Ministry of Finance of the Slovak Republic.

Effective from 1 January 2014, the system of reporting financial statements, annual reports, and audit reports to the RFS has changed. Since 1 January 2014, accounting entities no longer report the balance sheet and profit and loss statement in the Business Journal as before the introduction of the RFS. Unlike the legislation effective until 31 December 2013, the RFS also includes annual reports, and the accounting entities were relieved of the duty to report interim financial statements. The RFS is an information system of the public administration containing financial statements, audit reports, and annual reports pursuant to Section 23 to 23d of the Accounting Act, as amended. The RFS is divided into public and non-public section. The public section contains financial statements of companies, cooperatives, state-owned enterprises, state administrations and agencies, IFRS entities, and other accounting entities selected. The non-public section includes financial statements of other accounting entities, such as natural persons and non-profit organizations, which have no such reporting statutory obligation. Information reporting in the RFS is free of any charges.

Incomplete financial statements are listed in the RFS for the period of 2009 - 2012. (Pakšiová, R., 2016) Previous data was added to the RFS from the following sources: The Treasury Information System and Central Consolidation System submitted individual and consolidated government accounts in structured form; DataCenter submitted data from the financial statements of cities and municipalities and their subordinate organizations in structured form; the Financial Directorate of the SR submitted scans of financial statements of entities; financial statements of IFRS entities were added from the Business Journal. This information cannot be considered complete. Notes to financial statements were not submitted during 2009-2012, and thus they are not included in the public section of the RFS,

except for accounting entities that submitted their financial statements in a written form (provided that they were scanned and assigned properly).

Accounting entities currently do not submit any documents directly to the RFS. Documents are submitted to the RFS pursuant to Section 23b of the Accounting Act, as follows:

1. Documents produced in a paper form are submitted to the tax authority and there converted to an electronic form and subsequently forwarded to the RFS;
2. Documents produced in an electronic form are submitted via the Financial Administration portal (www.financnasprava.sk);
3. Public administration entities submit documents through the Treasury system.

The statutory duty to submit and disclose information is deemed complied with the moment they are submitted to the Financial Administration (in writing, electronically). Public agencies shall submit their financial documents via the Treasury system to comply therewith.

Accounting entities have no longer duty to submit documents directly to the Commercial Register, because this is done automatically since the integration of the information systems. The following documents of entities registered in the Commercial Register - pursuant to Section 3 of Act 530/2003 Coll., Commercial Register - are forwarded from the RFS to the Commercial Register:

- General purpose financial statement and extraordinary financial statement, consolidated financial statement;
- Annual report;
- Audit report; and
- Financial statements date of approval notification.

Individual financial statements, individual annual report, consolidated financial statements, and consolidated annual report of entities pursuant to the Accounting Act shall be submitted to the RFS (pursuant to Section 23 (1) of the Accounting Act). Financial statements for 2013 and others are added to the RFS from the following two sources (RFS, 2018):

- Financial statements and documents related thereto are added to the RFS by the Financial Administration;
- Financial statements of public agencies are added from the public administration information systems (Treasury information system, Central Consolidation System, DataCenter information systems).

It is possible to fill the system with several types of data thanks to its design. In case of double-entry accounting system, the following information is available in the RFS (RFS, 2018):

- If submitted in writing, scan of the Balance Sheet, Profit and Loss Statement, and Notes;
- If submitted electronically, Balance Sheet, Profit and Loss Statement, and Notes displayed electronically;
- Structured data from the Balance Sheet and Profit and Loss Statement;
- Additional documents in electronic form (audit report, financial statements approval notification, annual report).

3.3   Statutory Reporting

Business entities, cooperatives, state-owned enterprises, and non-profit organizations shall submit documents to the tax office or electronically to the Financial Administration of the SR pursuant to Act 563/2009 Coll., Tax Administration (Tax Code), as amended.

Full compliance requires to submit complete and accurate forms as provided. Documents are submitted to the RFS electronically or in paper form. VAT payers shall communicate electronically with the Financial Administration since 2014. Since 1 January 2018, the statutory electronic communication was extended to all legal persons registered in the Commercial Register, which will apply to all natural persons from 1 July 2018. Electronic communication also applies to all documents submitted and published subsequently in the RFS. For this purpose, it is required to obtain access to authorized eServices. Specific application and authorization information can be found at https://www.financnasprava.sk/sk/elektronicke-sluzby. PDF is the preferred format of any and all electronic communication.

Documents of non-standardized structure (consolidated financial statements, annual reports, audit reports, summary financial statements, selected statements, and documents produced in a foreign language) shall be submitted to the RFS electronically as an attachment to the standard submission.

Accounting entities have the duty to produce financial reports within six months of the accounting period, unless otherwise provided for in applicable legislation. Accounting entities subject to the Accounting Act (or specific regulation) shall have their accounts reviewed by an auditor. Accounting entities subject to the auditor's review shall produce an annual report. Financial statements shall be protected and kept in the company's archive. Financial statements and annual reports shall be kept for a period of 10 years following the year to which they relate pursuant to applicable legislation.

Under Section 23a (4) of Act 431/2002 Coll., Accounting, as amended (2018), accounting entities shall submit unauthorized financial statements to the RFS and subsequently the notification of authorization, if applicable and within 15 days thereof. In case of no changes between the unauthorized and authorized version of the financial statements, the accounting entity does not need to resubmit it. The same period of 15 days for an entity applies to the storage of revised and newly approved financial statements prepared after the opening of the accounting records by which the entity replaces the already submitted and approved financial statements. Notification of authorization shall be submitted electronically via electronic mailbox of the Financial Administration of the SR (hereinafter the "FA") with an attachment indicating the date of authorization thereof. The process of submission of authorization is the same as the process of submission of other documents (via electronic mailbox of the FA).

In the case of public accounting entities, the duty is deemed complied with by submitting documents through the Treasury system pursuant to Act 291/2002 Coll., Treasury, as amended.
IFRS entities shall publish the following information on their websites for a period of at least one year pursuant to Section 17a of the Accounting Act:
- Notification of financial statements submission to the RFS;
- Complete financial statements in the same extent and deadline as submitted to the RFS (Section 23d (5) of the Accounting Act).

Annual reports - individual and consolidated - shall be submitted to the RFS no later than one year after the end of the accounting period to which they relate (Section 23a (7) of the Accounting Act). First financial statements were submitted to the RFS related to the accounting period ending on 31 December 2013 and later. Annual report, as well as the audit report and other documents, shall be submitted by all entities (except for public agencies) electronically via the FA portal.

Since the disclosure of business information is ensured by the FA and entrepreneurs are required by the Accounting Act (2018) to observe the deadlines, content and scope of the information provided, in the event of non-compliance, they commit an administrative offense which is liable to a fine of up to 2% of the total assets declared:
- in the balance sheet prepared for the reviewed accounting period in the valuation adjusted for correction items, but not more than 1 mil. euros,
- in the statement of assets and liabilities compiled for the reviewed accounting period, up to 1 mil. euros.

In 2018 the FA is, pursuant to the amendment of the tax regulation, going to create an objective, independent and legal evaluation model of tax subjects built on approximately 40 criteria including specific tax regimes for reliable tax subjects via the tax reliability index. It will distinguish between reliable, less reliable and unreliable legal persons.

3.4 Statistical Analysis of the Number of Submissions During 2012-2017

Several private Slovak companies are engaged in the analysis of the number of submissions of financial statements. It can be said that they all get information from electronic information available freely and from the RFS in particular. Most of them provide their services via Internet. These analyzes are mostly accessible by paying a subscription, which is either valid for a limited period of time or for a limited number of analyzes. Some of them publish free partial analyses and statistics either by certain criteria or for specific entities, including several financial health indicators, either numerically or graphically, for one or several accounting periods For example, Finstat publishes free analyzes on its website at https://www. finstat.sk, where users can filter and search for several criteria, such as year, area, revenue, earnings, assets, income tax due, or date of publication. Finstat publishes free graphs (at least for a period of 7 years) with the indicators of the financial health of any entities, such as the progress of profits, revenues, other earnings, assets, equity, total debt, gross margin in the last year, and taxable income, displayed in a user-friendly interface, which helps to search for and display useful business information. See Table 1 for authorized on-line sources, content and frequency of information updates published on https://finstat.sk/.

Table 1 **Sources and information updates in Finstat database**

Data sources	Content of monitored information	Update
RFS	economic results and financial situation of businesses	daily
COMMERCIAL REGISTER	changes in places of establishment, statutories and other changes in businesses	daily
BUSINESS JOURNAL	bankrupts, restructuralisations, liquidations, auctions...	daily
BANKRUPT REGISTER	Information on bankrupts and restructuralisations	daily
TRADE REGISTER	changes in places of establishment, line of business and cancellation	monthly

Data sources	Content of monitored information	Update
REGISTER OF PUBLIC SECTOR PARTNERS	end users of benefits, changes in registration	weekly
FINANCIAL ADMINISTRATION	monitoring of debts to the tax office	monthly
	change of VAT payment status	twice a week
SOCIAL SECURITY INSURANCE COMPANY	debts, arrears	twice a week
GENERAL HEALTH INSURANCE COMPANY	debts, arrears	weekly
UNION INSURANCE COMPANY	debts, arrears	weekly
DÔVERA INSURANCE COMPANY	debts, arrears	daily
JUDICIAL DECISIONS	bank drafts	weekly
INSOLVENCY REGISTER	insolvency proceedings of Czech businesses	daily
CZECH STATISTICAL OFFICE	number of employees, CZ NACE, Business ID, place of establishment...	once a month

Source: Finstat, 2018.

Based on the analysis of Finstat data (Finstat, 2018), which obtains, updates, and subsequently handles information on business entities from the RFS, Table 2 shows the number of documents disclosed by accounting entities by their respective type for the accounting periods ending in 2012 and 2013 with the accounting periods ending in 2014, 2015, 2016, and 2017, taking into account that some accounting entities report for a calendar year and other for an economic year.

Table 2 **Number of Submissions Year-to-Year Comparison**

Year	2012	2013	2014	2015	2016	2017 (Submitted by 27/2/18)
General Purpose Financial Statements	148 796	184 623	209 732	210 257	215 221	10 481
Extraordinary Financial Statements	1 590	451	3 411	4 559	3 669	2 038
Individual Annual Reports	78	7 419	9 205	9 589	9 410	108

Year	2012	2013	2014	2015	2016	2017 (Submitted by 27/2/18)
Consolidated Annual Reports	1	895	905	933	874	0
Total Number of Submissions	150 465	193 388	223 253	224 405	229 174	12 627

Source: Finstat, 2018.

From the statistical analysis, we can observe a significant increase in the number of submissions since the amendment to the Accounting Act establishing the RFS. This can be attributed to the change in the method of reporting of balance sheets and profit and loss statements in the Commercial Register since 1 January 2014 (i.e. for 2013), when accounting entities were relieved of this duty, and thanks to the integration of the information system, this information is submitted by the Financial Administration or Treasury, in case of public agencies respectively, once they are received in the RFS.

4   Conclusion

Internet, as a publicly available worldwide system of interconnected networks, which facilitates rapid data exchange throughout the world, has great potential for flexible decision making in today's fast-paced world. Thanks to its almost-unlimited reach and extent, it became an essential means of social communication and information gathering in all areas of application. Company managers and executives, as well as any other entrepreneurs with specific needs, are browsing the Internet for any information related to the business and use it in their decision making processes. Reporting of quality financial and non-financial business information has a growing importance and time becomes the essence of management, especially in today's dynamically changing business environment. The credibility and availability of relevant and sound information is a prerequisite for making good and accurate decisions not only for the managers, but also for any users of information that rely on information sources available publicly. Resources should be judged from the point of view of the relevance of the compiler, providers and their authorizations. Risks for on-line information users are identified in taking late or incorrect decisions dependent on relevancy, completeness, correctness and timeliness of information, therefore it is necessary to focus on authorized sources, such as information provided by public institutions and official registers. The biggest risks of authorized online information sources on businesses may be seen

in a time interval between the occurrence of a given matter and its publication on the Internet. Not only all taken-over and subsequently published information always have this time interval in its primary sources, but there is also always a certain degree of uncertainty, error, incorrectness or misrepresentation in its using, that can sometimes be caused unwillingly, e.g. due to the technology setting of big amount of various data processing to unify and consolidate the analysis outputs. Therefore, it would be useful to confirm this information in a trustworthy first source before the final managerial decision is made, especially if it is a significant one for the business. Trustworthy sources include those that are provided on the basis of verifiable facts, such as the list of debtors of state institutions, Financial Administration, Social Security Insurance Company, and Health Insurance Companies. Often, however, they are not updated immediately, and sometimes it takes time for a debtor to be deleted legitimately.

The availability of financial and non-financial information of accounting entities has increased since the introduction of the RFS in 2014, when the accounting entities - instead of reporting directly - submit their documents to the Financial Administration or Treasury, in case of public agencies respectively. As regard the credibility of this information and given its nature, the financial statements in particular - which is the basis for calculating taxable income base and the income tax of both legal and natural persons - are subject to full review and audit system of the Financial Administration. In the case of non-compliance with the disclosure obligation, or the content and extent of the information provided, enterprises may commit an administrative offense for which a fine may be imposed by tax administrators, which may in some cases amount to up to 1 million euros. In 2018 the Financial Administration is, pursuant to the amendment of the tax regulation, going to create an objective, independent and legal evaluation model of tax subjects built on approximately 40 criteria including specific tax regimes for reliable tax subjects via the tax reliability index. It will distinguish between reliable, less reliable and unreliable legal persons.

Based on the statistical analysis, we can conclude that business information on the Internet has growing importance in recent years with several shortcomings related to its process of updating that need to be addressed. When gathering and evaluating information from the Internet, it is important to choose the right sources credible and sound, because not all information on the Internet is true.

Acknowledgments

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UNDERSTANDING THE EFFECT OF E-LEARNING, THE ROLE OF DIGITAL LITERACY

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Abstract

Nowadays we often encounter the view that the current society is increasingly based on information work. However, the company, which is based on the penetration of information communication technologies and information into all areas of social life, is called an information society. In this society, all aspects of life (technology, social, economics, and politics) depend on access to information. It is, therefore, natural that new demands are constantly being put on education in the information society. The current trend in pupil education and education is the requirement for the pedagogue's ability to work effectively with information and lead to his / her pupils. In order to be able to survive in an informational society, it is necessary to emphasize digital and information literacy and the associated modern educational process. Information and communication technologies have an irreplaceable place in the educational process since their inception. Paper is focused on the definition of the pedagogue's tasks in the use of information and communication technologies as well as the characteristics of digital competences.

Keywords: *digital literacy, e-learning, information communication technologies*

JEL Classification: *C83, J20, J22*

1   Introduction

The term information and communication technologies (ICT) means information resources such as the Internet, educational applications and various multimedia and hypermedia elements that are used in the educational process. These technologies work on all senses (Binkley. 2010), (Gottesman, 2000). Thanks to their new capabilities, they have an important role to play in acquiring knowledge and information and managing the cognitive process. ICT has become an important driving force in everyday life and economic activity. Most people in Europe today use a personal computer for various purposes, especially for the younger generation, the use of a computer is common every day. The integration of personal computers into education responds to these trends (Knuth, 1996). Using of ICT is needed in the context of the needs of modern didactics of informatics to develop and explore the computer literacy competencies (Záhorec et al., 2014).Successful use of personal computers in education depends not only on their availability but also on user knowledge. This also applies to access to the computer network of the Internet (Rieber, 2004).

ICT provides different kinds of tools that give new opportunities for classroom education. In particular, they make it possible to adapt the educational process to the individual needs of pupils and also provide the user with the important digital competences needed in our knowledge society. Pupils have to acquire a great deal of information, and therefore puts society in increased demands on the quality and quality of learning technology (Blaho, 2010), (Brdička, 2003), (Mikulecká, 2009). It is generally assumed that ICT has a positive impact on learning (Figure 1). The benefits go beyond the use of computers and the Internet. It also includes the use of technologies other than digital cameras and mobile phones that can support pupil education and personal development. Currently, the theory of constructivism is the most embedded in teaching ICT (Pound, 2005). Nair (2009) and Byron (2008) report that pupils and students are coming into a class with some experience and based on them with cognitive structures.

Figure 1 **Effective use of ICT in the educational process**

Source: Tapscott, 2009.

These changes, transformed under the influence of new experiments, so that these experiences, respectively. Information incorporated, integrated into existing structures (Chittaro et al., 2007), (Šilerová et al., 2017). This structural link between new and old information, as well as the various ways of processing the acquired information and the thought-based activity derived from them, new knowledge and conclusions are from the point of view of the learning active constructing process, which is a prerequisite for meaningful learning (ISTE, 2007), (Kluge et al., 2008).

2   Data and Methods

During pedagogical research we used the following research methods: Preparation for scientific research activity, study of domestic and foreign literature. By classifying and registering, we have been leaning on mediated facts and knowledge published in books and magazines and written documents. Methods of obtaining new data on the pedagogical process based on methods of measuring object situations - observation, experiment and methods of data acquisition through subjective statements - interview, questionnaire, knowledge test. Methods of processing obtained data - quantitative (statistical) and qualitative (method of logical analysis and synthesis, method of comparison). The basis of the educational methods and tools used was the fulfillment of individual basic didactic principles of education. The main objective of the research is to contribute to the clarification of some aspects of the topic being processed, to point out the complexity of

the issue of deploying multimedia information and communication technologies in the educational process, and to try to highlight the didactic efficiency in their use as well as the need for a comprehensive and interdisciplinary approach to such a solution in the educational area. The main objective of our research was to verify the degree of dependence between the effectiveness of learning through e-learning and the computer literacy of students. To achieve the main goal, we set partial goals:

- definition of theoretical backgrounds,
- verification of digital literacy of students,
- implement education through e-learning,
- evaluate results.

We formulated the following hypotheses:

Digital less literate students will need more time to acquire sufficient knowledge, skills and the ability to use the e-learning course itself. Digital literate students are aware of the benefits of learning through e-learning, which raises their interest in learning in this form.

3   Results and Discussion

To obtain, process, and evaluate data, we used a study of literary sources that we conducted during the period before the research began to better focus on the subject. In the research work, we used pedagogical observation by observing students during the educational activity during the experimental period. For the analysis of quantitative indicators, we used the basic statistical breakdown. We used the following mathematical and statistical characteristics to process and evaluate the obtained data. We used other analysis methods, analysis, synthesis, inductive and deductive procedures. We have evaluated and processed the facts obtained with the help of research methods in tables and graphs and interpreted them.

In order to achieve the required degree of objectivity of the obtained and processed results we used a didactic test with a control function. The test tasks were selected as the most appropriate on the basis of the consultation during the preparatory period of the experiment. The information obtained by the didactic test was preconditioned to meet the requirement of validity, reliability and practicality of the didactic tests. The didactic test was applied to content valid (valid, appropriate) and included test assignments, covering and comprehending the curriculum that was taught. The degree of reliability, ie accuracy and reliability, is commonly influenced by several factors. A certain measurement error will always occur and cannot be removed. The results are influenced by fatigue, student inattention, estimation, and the like. The practice of didactic tests as their further

characteristic was that they provided adequate and reliable information in a relatively short time from a large number of pupils in a way that allows comparability of the results. We used test assignments to match test and answer choice tasks. Assignment Testing Tasks: It was about assigning elements of the course to identify (recognizing), assigning relationships between concepts and properties. Responses choosing answers to assessing and selecting knowledge and relationships with the use of tasks with multiple correct responses. The results of the pedagogical experiment were processed in terms of both quantitative and qualitative analysis, on the basis of which we interpreted the results.

The experiment was preceded by careful coordination and alignment of the work of all the teachers who participated in it. The tasks and objectives of the experiment, as well as the agreed methods and protocols to achieve them, have been thoroughly developed. Given the unequal timing of the timetable, it was necessary to set a time span and a common test date.

E-learning not only consists of textbooks placed in AIS, but also from external sources and unmanaged self-study, including searching for information outside the provided sources. Pre-it was not possible to monitor all student activities within e-learning. However, it is not possible to obtain reliable data, since opening the course for some time does not mean that the student spends all of his time intensively on e-learning only. The maximum number of points in the entire test that the pupils of both groups could receive was 55 points. The total mean result of the experimental group was 44.62 points. The overall average score for the control group was 31.22 points. The distribution of the values of both cases was Gaussian - normally the most common in nature occurring. Two-sample t-test confirmed that the mean value of experimental group 44.62 was statistically significantly higher than the mean value of control group 31.22 ($p = 0.000$). The homogeneity of the sets was the same - the odd-to-tweak scores of 2.31 and 2.20 did not differ statistically significantly, the difference between the worst and the best in both groups was the same, homogeneity ($p = 0.432$).

The maximum number of points you could get when answering Task 1 was 2 points. In the experimental group, the total score of 1.14 scores was statistically significantly greater than the mean score in the control group of 0.25 ($p = 0.000$). Also, the variability of the score values achieved in both groups differed statistically significantly. The benchmark of the evaluation of the experimental group 0.72 was statistically significantly lower, the standard deviation in the control group was 1.03 ($p = 0.002$). We can say that the experimental group was more successful, the differences between the individual pupils in the experimental group were smaller than in the control group.

The maximum number of points that could be obtained for the answers to task 2 was 1 point. In the experimental group, the total mean score of 0.8 was statistically significantly greater than the mean score achieved in the control group of 0.21. The variability measured by the standard deviation in the experimental group of 0.60 and the control group 0.71 did not statistically significantly differ. The experimental group was more successful, but the knowledge was more homogeneous, the homogeneity of knowledge in both groups was at the same level.

Table 1 **Statistical evaluation of the experimental and control file at question 1**

	Average	Average	T-test	Degrees of freedom	Significance level
	A	B			
Q1	1,14	0,25	6,27	177	0,000

Standard variation	Standard variation	F-test	Significance level
A	B		
0,72	1,03	1,92	0,002

Table 2 **Statistical evaluation of the experimental and control file at question 2**

	Average	Average	T-test	Degrees of freedom	Significance level
	A	B			
Q2	0,8	0,21	6,33	178	0,000

Standard variation	Standard variation	F-test	Significance level
A	B		
0,60	0,71	1,40	0,113

The maximum number of points you could get in the answers to task 3 was 2 points. In the experimental group, the overall mean score reached 1.26, which is statistically significantly higher than the mean score achieved in the control group of 0.89. The variability measured by the standard deviation in experimental group 1.22 of control group 1.16 was the same. In the experimental group, the overall average score was 1.26, which is statistically significantly greater than the mean score achieved in the control group of 0.89. The variability measured by the standard deviation in experimental group 1.22 of control group 1.16 was the same. The experimental group was statistically more successful than the control group, but

the knowledge was more homogeneous, the homogeneity of the veins in both groups was at the same level.

4 Conclusion

Digital technologies as a technical means of educational process attract pupils through their architecture and functionality. With high-quality educational software, it contributes to greater focus and keeps pupils' attention by constantly communicating with the user. The ability to immediately verify your own interests, to use your own imagination and logic is a powerful motivation tool for working with your PC. Through its interactivity, communicativeness, objectivity and discretion, it motivates pupils. The multimedial education software at the level of interactions acts to increase the level of concentration and attention. It can greatly help in learning what cannot be shown or represented better by other didactic means. The results of our pedagogical experiment have shown that the way we touched the subject of Technical Education using appropriately selected digital technologies was appropriate. Pupils appreciated the quality of study and work materials that were used for teaching and very much appreciated the way they were used. Teachers have sincerely stated that they had some concerns at first, but appreciated themselves with the help of modern technologies to "discover" new dimensions of education. Using a suitable methodology, teachers of all ages are able to work with digital technologies and know how to apply them to any subject. Digital technology needs to be implemented in the education of all subjects, so it will be necessary to gradually change the relationship between the teachers of informatics teachers and the teachers of other subjects need to come together, help and jointly implement the strategy of transforming a traditional school into a new modern school - the modern information and communication technologies of education. It is always necessary to look for new optimal opportunities for digital technology at school for the widest range of teachers and pupils. Nowadays it is not enough to have personal computers connected to the Internet centered in a special classroom, it is necessary to implement modern technologies gradually into vocational training, in laboratories, to create a special room for teachers.

Digital technologies open up new dimensions of education that bring changes not only to the content of education, but also require the application of new methods and forms of learning, building a new teacher-pupil relationship, greater responsibility and more active pupil access to education. The implementation of the transformation of education for the needs of education requires a legislative adjustment of the necessity and the need for further teacher education in the field of introduction and use of ICT in teaching, creating a new concept of career

progression of the teacher, developing new forms of lifelong teacher education, obtaining certificates.

The cause of the expansion of the didactic triangle, the fourth component of didactic means, was the increasing importance of modern didactic aids in the teaching process. Under the influence of the transfer of modern didactic technology, especially computers, the teacher's position in teaching is changing. Modern digital technologies create a new situation for the pupil as well, as it changes his learning conditions, creating a new sensorimotor space for receiving and processing information. On the one hand, pupil communication enriches, refines and intensifies, but, on the other hand, it degrades social contacts. The teacher must therefore choose such a teaching strategy in order to achieve optimal results. The pupil is at the forefront of perception, preservation and use of knowledge, their creative application, active co-operation with teachers and other pupils, self-supervision and independent study.

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HOW TO INCREASE STUDENTS´ ENTHUSIASM

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Abstract

The aim of the paper is to emphasize the need for increasing students´ motivation in their study, find ways how to enhance their enthusiasm and provide them with attractive education.

We compared success of students in partial exams in a differentiated way of teaching (contact teaching versus e-learning) in the course of Indoor Plants assuming the impact of their own motivation on the test results. The results here from revealed that students are generally not ready for e-learning self-study.

A questionnaire survey was conducted on those students having completed the course of Applied Interior Design in order to evaluate the benefits of a practically-orientated project to increase their interest in the subject and the field of study. The aim of the project was to find out about growing demands of the selected range of indoor house plants, thus stimulating students to cultivate plants based on their own real experience. The results of the questionnaire survey point to an increase in students´ interest in the practical form of projects, building of the relationship with the study field (and plants) and willingness of students to invest their own financial and material resources into the project. The project taught students how to think about the practical aspects of plant cultivation and care, provided space for confronting the acquired knowledge and experience of teaching, and helped to create a relationship with plants, which is crucial for application in the field of landscape architecture.

Keywords: *education, e-learning, motivation, enthusiasm, Landscape architecture study*

JEL Classification: *I2, P36*

1   Introduction

Engaging and motivating today´s generation of students is beginning to be rather difficult. Unlimited possibilities often lead to their indifference, a lack of inspiration, diligence and motivation.

The aim of the paper is to evaluate the students´ enthusiasm in the course of Indoor Plants depending on the different teaching methods (contact teaching vs. e-learning), as well as assessing an increase of their motivation in connection with the practically-orientated semestral project in to Applied Interior Design.

In the winter semester 2016/17, students were tested to evaluate their success in the partial exam, depending on differentiated teaching method in the course of Indoor Plants. We also wondered if the students´ own motivation had an impact on the outcome of the partial examination in contrast to teaching in the class. From the point of view of assessing the motivation (enthusiasm) of the students, we assume that during the contact instruction there is a possibility of motivation of students by a teacher. In e-learning, it is essential for a student to have a considerable degree of motivation that inspires him/her to study independently and search for information in the electronic environment. We can conclude that the outcome of the partial examination in a different way of teaching is influenced by the students´ individual approach, motivation, purpose because self-study requires a certain amount of student´s discipline.

The use of IT in education is an integral part of the teaching at the Slovak University of Agriculture in Nitra, Slovakia (Hillová, 2016, Tóthová, 2016) and an electronic platform to improve and make teaching more attractive is created through the grant project KEGA 035SPU-4/2016 - Interactive Experimental Garden (Hillová & Šajbidorová, 2016).

The course Indoor plants is a compulsory course in the 5ˢᵗ semester of the Bachelor Study programme of Landscape and Garden Architecture at Horticulture and Landscape Engineering Faculty at the Slovak University of Agriculture in Nitra, Slovakia. Exercises from this subject are scheduled for 2 hours/week, and every second week lectures are held for 2 hours. The focus of the course is to acquire basic knowledge about the origin of indoor plants in terms of geographic, ecological and climatic aspects, to learn about bioclimatic factors of plants, to approach methods of cultivation, care and propagation of indoor plants. Exercises from the subject are orientated towards practical understanding of the range of indoor plants in the Botanical Garden at the Slovak University of Agriculture in Nitra. E-course Indoor Plants consists of seven themes, the main part of which is the information summarized in e-books with the purpose of improving knowledge acquired through the URLs of links relevant to the topic.

In the winter semester 2017/18 a questionnaire survey was carried out between students after completing the course Applied Interior Design in order to evaluate the benefits of the practically-orientated project for increasing students´ interest in the studied course and the field of study, as well.

Applied Interior Design (AID) is a compulsory course in the 1st semester of the Master study programme Biotechnics of Park and Landscape at Horticulture and Landscape Engineering Faculty at the Slovak University of Agriculture in Nitra, Slovakia. This course is scheduled for3 hours/week. The focus of the course is to acquire knowledge about the influence of plants on the humankind, the aesthetic, architectural significance of the use of green in the interior, the cultivation technologies for indoor plants, modern trends in the use of the range of indoor plants. Students also deal with the analysis of indoor conditions from the point of view of plant growing and processing of the design study of interior arrangements.

Within the given term, a practical semestral project named The monitoring of growing demands for indoor plants, was a subject of credit assessment. Based on our teaching experience in previous semesters, when the final output from the course was the project study for interior arrangements with green design, we decided to change the project scope of the AID this time. From our own observations and assessments, we found that students have very weak knowledge and experience of growing indoor plants, do not use their positive features, do not have practical skills related to plant care, and for this reason their project studies were often only "inspirational collages,, downloaded from the Internet without a real idea of growth and functioning of their proposed planting design. Therefore, the aim of the AID was to focus on its own practical project, from which students acquire real knowledge and skills in the cultivation of indoor plants, which is crucial for the planting design.

Teaching any subject (course) should prompt the learner to study because it is necessary. Not only because the students are able to carry out an activity, and becomes attractive to a potential employer, but also they can study other subjects, develop their own views, which eventually helps to create their own personality. The teacher should ask why the student should study his/her subject matter. The answers such as it is essential to learn the subject in order to gain insight in the field are not the right ones (Lojda, 2016).

The professionalism and personal well-being of the teacher, correct attitude to students, knowledge, acceptance and updating of their needs is one of the ways for motivating students , encourage their activities and cooperation (Grofčíková, 2007).

A university teacher should not forget that s/he works with adults who have their own ideals, opinions and attitudes. A good prerequisite for effective

student´s motivation is taking them as partners who, in addition to learning something from us, can also teach us something new. Students are able to look at the pedagogue very critically. They follow his/her speech, behaviour, not only while teaching, but also in the external environment. They also follow teacher´s non-verbal communication when she/he speaks, whether s/he express-es his/her own interest in the subject matter as well as the students, his/her mood and knowledge (Šebová, 2007).

2   Data and methods

51 students participated in the test of influence of differentiated teaching methods on results of the partial examination in the course Indoor plants. The students were informed about the date of testing and its topic. The students were not no-tified of any further use of test results. Students were acquainted with different forms of topic mediation (contact education and e-learning). We have set these hypotheses:

H01: There is no difference between success of the partial examination and a different approach to education (contact education vs. e-learning) in the course Indoor plants.

H02: there is no difference in the intensity of approaches among the e-books from which the reported test is written and those from which the test is not written in the course Indoor plants. The test results were evaluated by the Pear-son's chi-square test at a significance level of 99%.

11 of 14 students participated in assessment of the practically-orientated pro-ject in the course of Applied Interior Design was attended by. The goal of the se-mestral project was to gain a realistic vision of the growing demands of the select-ed range of indoor plants. The students´ role within the project was the purchase or obtain three pieces of different species of indoor plants which they will take care of throughout the semester and monitor the cultivation operations carried out here on (determination of irrigation dose and interval of irrigation, deter-mination for fertilization of plants and execution of maintenance on plants) and morphological changes (growth of vegetative parts, flowering). At the beginning, it was necessary to analyze the conditions in the selected interior (light, air hu-midity, temperature conditions) and justify the selection of the plant assortment to these conditions. Students had a choice of options: buying new indoor plants and growing them at the college or selecting from already functioning plants at the place of their residence. The role of the students was to monitor cultivation of the selected plants at specified intervals, set the optimal irrigation dose and the

optimum irrigation interval for the plant, monitor its morphological changes and analyze the possible health problems of the plants.

 We assumed that one practical experience can replace a number of memorized information about plant cultivation. In fact, students did not know how to estimate the correct irrigation dose and irrigation interval for plants, they were unable to analyze plants´ health status and prosperity, respectively failure to thrive in the interior.

This only confirmed importance of implementing this project and its contribution to their own development.

However, it is worth noting that control days and communication between the teacher and the students about the course of plant growing were often full of very positive and funny experiences.

The survey was created and analyzed by Google Forms. The survey involved 71% of graduates (10 students out of 14). The questionnaire survey was sent to students after filling for the exam in January 2018.

3   Results and discussion

3.1   Evaluating of the partial exam success in a differentiated way of teaching

The results of evaluating of the partial exam success in a different way of teaching in the course of Indoor plants confirmed the assumption that the contact method of teaching is perceived as more understandable and accessible for students. The topic they were about to study was presented in a PowerPoint presentation during the lecture, and university scripts were also available. 76% of students answered correctly to 80% and more of the test questions, which is 4 out of 5 students. The chi-square statistic is 13.6609. P-value is 0.003405. The result is significant at p <0.01. (Table 1).

The results can also be influenced by the fact that the teacher can motivate the students to get interested in the subject during the lecture. There is an opportunity for verbal explanation of unknown concepts, brainstorming of new ideas and room for further discussion.

When evaluating the intensity of access to e-books depending on the announcement of the partial exam realization, we found out that up to 88% of the students opened the e-book when the partial exam was requested. If the announcement of the partial exam realization was not recommended, an average of 47% of the students opened six e-books during the semester (Table 2).

The evaluation of the partial exam, which the students were preparing for through e-books in the LMS Moodle, pointed out some of their deficiencies, unless they are not led by a teacher and are individually responsible for the selection of essential information from the literature. Their ability to orientate in relatively rich content in LMS Moodle appears to be low. Only 14% of students were able to answer correctly all the questions asked in the test. 20% of respondents answered correctly to 70% of the questions It is evident that students are not fully prepared and capable of learning, perhaps due to their own in capacity or bad learning habits, to sufficiently orientate themselves in e-learning, select independently essential information from the text or t work with foreign articles and web pages. It is easier for them to passively receive information from the teacher in a class.

Learning the subject matter from e-books, links to websites or scientific papers is a more demanding form of education compared to the contact form of teaching (lectures, exercises, university scripts) although today´s generation is seen as computer and IT literate. However, it is problematic for students to choose essential information from the literature by themselves, what is a teacher´s role in the contact form of study. The exam results that were independently studied by students in LMS Moodle suggest that a few students are able to select from more complex information and understand the context of the subject matter, which reflects their personal qualities and prerequisite to master a university degree.

Table 1 **Frequency distribution on a partial exam depending on the differentiated approach to education (contact education vs. e-learning)**

points from the exam	frequency distribution	contact education	e-learning	totally
min 4 points	80 and more % points from the exam	39	21	60
min 3 points	60-79%	6	17	23
min 2 points	50-59%	6	12	18
min 1 points	49% and less	0	1	1
	totally	51	51	102

Table 2 **Frequency distribution on the intensity of the access to the e-books by the announcement of the partial exam realization**

frequency distribution	e-book access for several times	no e-book access	totally
e-book access with announcement of the partial exam realization (1 e-book)	45	6	51
e-book access without announcement of the partial exam realization (6 e-books)	180	126	306
totally	225	132	357

3.2 Evaluating an increase in students´ motivation in relation to the semestral project of the Applied Interior Design

The students' reactions to the practically-orientated project in the course of Applied Interior Design show that 92% of the respondents considered the project to be interesting even prior to the solution although they could not estimate its contribution to their own development.

Nearly 84% of students identified the implementation of control monitoring days during the semester as beneficial from the point of view of confronting knowledge and experience with the teacher and also among the students. Checks were performed every 2 (4) weeks. In a friendly atmosphere the students presented the paper about plants cultivation operation, communicated their findings, plants growing problems and also cultivating achievements and subjective observations. These meetings provided room for mutual learning (student vs. student, student vs. teacher).

92% of students evaluated the given project as interesting, original and beneficial for their further study at the end of the term. „. The most important benefits (the students could chose more than one option in the survey) were as follows: I have learned how to cultivate indoor plants (58%), I have built a closer relationship with the plants (67%), my relationship with the study field has considerably improved (50%), my relationship to plants has had a positive impact on my family and relatives (33%).

The results of the questionnaire survey among the students after the completion of the semestral project on the AID course point to the following findings:
- increasing students´ interest in the practical form of semestral projects
- acquiring (enhancing) the relationship to plants, which is a key factor for successful application in the field of landscape architecture
- willingness to invest their own financial and material resources into the project

During the control days or in the final presentation, about a third of students admitted a positive impact of the project for their own development in the study field. They expressed their enthusiasm for plant care, their interest in plant cultivation, and moreover, the project helped them to encourage and guide people around in planting issues, which will be of high importance in their professional careers. They also highlighted the fact that they were proud of creating attractive interior where plants were growing (dormitory rooms) and eventually managed to motivate their family and friends.

The teacher should be able to motivate his/her students to enjoy studying, see the contribution and benefits in the given field, and therefore the teacher should not stagnate and teach routine without any change. Nowadays, when a teacher's position within the society has changed considerably, it is essential to work on a teacher – student relationship, be able to motivate students and maintain their initial enthusiasm throughout the semester. We may conclude that the teacher is responsible for students´ motivation. When the teacher is properly motivated, positively tuned, and maintains a friendly, but professional relationship, and what is more, she/he is interested in the subject matter, he/ she can easily pass this enthusiasm to the student.

4   Summary

It is essential to increase constantly attractiveness of teaching. Today´s generation requires more and more stimuli, visual insights and attractive teaching methods. The teacher has to show the students proper thinking, increase their interest in the topic so as they would like to know, try and study

Acknowledgment

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WEBSITES OF SLOVAK UNIVERSITIES

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Abstract

The websites of Slovak universities play an important role. They are no longer just a graphical overview of the organization, but they are responsible representative for its products and brand.

The aim of the article is to highlight the importance of website creation tools, including their management, and to highlight one of the important attributes of website quality, which is usability - a user interface property that tells how easy it is to use this interface. Usability can be measured using different methods, models and tools. The well-known are: questionnaire, in-depth interview, heuristic evaluation, temperature maps of ´clicks´, A / B testing, eye tracking, user testing, traffic analysis, measurement models and usability evaluation, focus group (discussion in a group), card scoring, expert reviews, persons (customer prototype), storyboarding (a story described by a sequence of sketches with a description) and multiple checklists. Less known methods and tools will be described in the article.

Keywords: *www. website, usability, CMS, University portal*

JEL Classification: *O10, I23, D83, L86*

1 Introduction

In 1991, the first website was created. Number of websites is estimated at one billion nowadays (Internet Live Stats, 2017). Websites are used today as an information and educational tool, but they also entertain the user and are used as a tool for communication and branding. They are useful in making surveys; the questionnaires are made available to the visitors to websites (Hallova, Polakovic and Slovakova, 2017). Websites can help improve the image of the company, so

that they can fulfill the e-commerce function. However, the expected result is not reached, because a lot of information overwhelms many of the websites, they become disorganized and the user "loses".

Thanks to the usability theory and usability evaluation methods, these shortcomings can be removed, the satisfaction and competitive advantage can be reached back.

2   Data and Methods

2.1   Usability of the Web Interface

The term usability has become frequent in the design and management of websites and applications in recent years. When computer manufacturers began to track users and their behavior, they talked about user-friendly systems, interfaces. Later, experts have replaced this concept with a new one, namely the computer-human interaction (CHI) respectively human-computer interaction (HCI). Worldwide, however, several terms are used for the same purpose, so we can meet concepts such as man-machine interface (MMI) and human-machine interface (HMI).

The usability as understood today was defined by Nielsen (1993) as a quality attribute, which says how easy it is something to use. The usability of the web interface can be defined as a user interface property that tells how easy is to use this interface (LLC, 2015). Nielsen (1993) emphasizes that usability is only one dimension of the user interface. In the case of web interfaces, it is necessary to provide the user with an environment where he / she will not have to learn to work, it will be easy to remember, will not be error prone, and the user will like it (Nielsen, 2006). It is not possible to ask users to study manuals when they are only interested in certain information. The user interface must be intuitive and simple. Nielsen (1993) defined five qualitative usability properties:

- Learning - determines how simple is to understand basic tasks when first time working with the interface. We evaluate whether the user is clear about what the interface is dedicated to and what he or she should do to meet the goal.
- Efficiency - determines how fast tasks can be performed. The more often the task is performed, the more emphasis should be put on efficiency and therefore speed of execution.
- Remembrance - determines how difficult it is to use the web interface after the long pause.
- Error rate - determines how many errors users make when working with the interface.
- Satisfaction - determines user satisfaction with the use of the interface and its features.

ISO 9241-11 points to the origin of usability described by users, their roles and objectives, environments, equipment and it is measured by the criteria of efficiency (such as achieved goals: accuracy and completeness), effectiveness, performance (comparison of resources with the accuracy and completeness of achieved goals) and satisfaction (user's subjective attitude towards the application).

2.2 Usability assessment

Usability assessment is available for nearly all available products and services. The usability has its specifics on the Internet. When a user is not satisfied with the site, with one "click through" he or she may be on a different page, which in the case of a commercial character of the website may mean that the user gets to the competition site.

Usability can be measured using different methods, models and tools. The most well-known are: questionnaire, in-depth interview, heuristic evaluation, "crank" temperature maps, A / B testing, eye tracking, user testing, traffic analysis, models and measurement methodology and usability evaluation, focus group (discussion in the group), card scoring, expert reviews, persons (customer prototype), storyboarding, and multiple checklists. Below less known methods and tools are described (Galovicova, 2017).

Heuristic evaluation is an engineering method for finding user interface usability issues (Nielsen, 1990, 1994). Heuristic assessment is one of the so-called expert assessments based on an inspection requiring the presence of an expert. Assessors, experts are part of the design process, examine the interface and assess whether it complies with the recognized usability guidelines, heuristics. It is known that a heuristic evaluation reveals more than 90% of usability errors if at least three to five experts participate in the evaluation. There are number of heurists (Nielsen, Molich, 1990, Nielsen, 1994, Powals, 1996), but the most commonly used ones are the heuristics for user interface creation by Nielsen and Molich in 1990, modified in 1994: Visibility of the system state, consistency between the system and the real world, control and freedom of the user, consistency and standards, error prevention, recognition rather than memory, flexibility and efficiency of use, minimalistic design, help to users, error detection and its diagnostics and documentation.

Expert assessments based on the inspection may take the form of checklists. The checklist by Nielsen mentioned in his book Homepage Usability is the best known. It contains 113 points (Meyers, 2009). The second checklist is by the company User Effect – 25-point Website Usability Checklist, which contains 4 main areas - Accessibility, Identity, Navigation and Content, together 25 rating points. It uses simple three-color symbols (green symbol of accuracy („ ") = good, red

symbol of accuracy - needs to improve, but not bad and red cross - wrong) that tells if and how the site meets that rating point (Travis, 2014).

Another method of expert assessment based on an inspection is "web usability guidelines", that is, some guidelines, guides how to make a proper assessment. The company Userfocus introduced 247 such guides (Usabilitynet, 2006).

User Testing is a qualitative method that provides information on how users work on the site, how pages are going, how they perform tasks, what caused them problems, and what information was visible to them, or what they could not find.

Eye tracking is the process of eye movement. It allows us to monitor what the person is looking at. By observing what a person is looking at, we can see the sources of information he perceives.

Web analytics, known as the traffic analysis, is the utility assessment tool that delivers quantitative results. With the help of the software, the company can monitor its website. It reveals how many people visit the web, how long they stay and what are they doing, what they can do to help them understand how the site is used, where visitors come from and where they are heading, or where they left. The company can use the services from the host, local software (WebTrends Log Analyzer, QuestFunnel Web Analyzer, AnalogWebalizer, Mach5 FastStatsAnalyzer, NetGenesisNetAnalysis, W3Perl, etc.) or server software (WebTrendsEnterpriiseReporting Server, Urchin, MediaHouseLiveStats). In Europe, Google is the most widely used tool, Google Analytics and Google Tag Manager. Visual maps of clicks are used to visualize visitors' movement on the web. The links that users clicked on can be viewed from the home page level. The analysis is displayed as a reference map of the percentages that represent the number of clicks (Brooke, 1986).

SystemUsabilityScale (SUS) is a method that uses a questionnaire that consists of 10 questions with five options of responses for respondent; from ´I definitely disagree´ to ´I definitely agree´. Wording of the questions: 1. I would like to visit this page more often. 2. The site is unnecessarily complex (it contains unnecessarily large amounts of information and features). 3. I think it is easy to use this page. 4. In order to be able to use this page, I will need the help of another person who already knows the page. 5. I have found many good functionalities on this page. 6. I think there are many shortcomings on the site. 7. I think that many people would learn to work very quickly on this page. 8. I consider this page very clumsy. 9. I was very self-confident when working on this site. 10. I think I have to get to know the page first - use it several times so I can easily find the necessary information on the site. SUS was created by J. Brooke in 1986. It is used to evaluate a wide range of products and services, including hardware, software, mobile devices, websites and applications. It contains complex scoring (Brooke, 1986, Brooke, 2013, Sauro, 2011).

2.3 Methodology

Since we do not know whether and how the usability of the school website is evaluated, we did a primary research where we used the query – the tool was questionnaire - electronically distributed to those responsible for the university website. The goal of the research (Galovicova, 2017) was to find out how many colleges and universities in selected countries assess the usability of their websites.

VC1: What approach was used to create website (internal or external).

VC2: Web Usability Assessment Level.

VC3: Degree of Google Analytics data usage.

Research, the main goal of which was to fill in an information gap on the current state of assessment of the applicability of websites at universities, was complemented by a further assessment of the usability of the websites of universities in Slovakia. The aim of the additional research was to find out what the level of usability is achieved by the websites of universities in Slovakia. A combination of methods was used in the research:

Method 1: Querying. The respondent answers questions that are divided into parts: 1. Identifying (here he evaluates his computer skills on the scale 1-5, where 1 = the beginner, 5 = the professional. To the open question he/she answers the school name, this question being used only for control, students of which university answered).

Method 2: Remote testing. The respondent has the option to choose the school according to his or her interest, and according to the assignment, he performs a task to find on the school's website the study programs. Consequently, we find out if the task is fulfilled and how easy it was to accomplish it. The open question is asked for a subjective evaluation of the respondent's site.

Method 3: SystemUsabilityScale (SUS) - Score above 68 points is considered above the average and anything below 68 points is below the average. Interpreting the results is a scale (25 = terrible, 38 = weak, 52 = OK, 72 = good, 85 = excellent, 92 = best) (Brooke, 1986, Brooke. 2013, Sauro, 2011). The target group of the web presentation of universities is also secondary school pupils, who are potential future university students. The pupil normally does not attend all the schools personally, but has the opportunity to read about them in newspapers, brochures, and especially on the school's website. That is why we have identified the basic set of pupils attending the last year of selected secondary schools in Žilina Region, who have the opportunity to submit the application for study at higher education institutions during the monitored period. The exact number of pupils who have graduated this year has been obtained from the Department of Education of the

Self-governing Region (Kucharczyk, 2017). Determining the sample - the formula used to calculate the size of the minimum sample is:

$$n = \frac{N * t^2 * \sigma^2}{(N-1) * \Delta^2 + t^2 * \sigma^2}$$

Where: N - basic set, $\partial 2$ - scattering, ∂ - standard deviation = $\sqrt{(p * (1-p))}$, t - Table value (for N> 30 normal division) = 1,96 (at 95% confidence interval), Δ - Permissible error = 0,05. Table 1 shows the calculation

Table 1 **Calculation of the sample file**

	Žilina region	Slovakia
N – number of high school graduates	6237	45358
p	0,1375	
$\partial 2$	0,1186	
n	177	

Source: Own.

3   Results and Discussion

The Internet has long been a medium that allows sharing of information in text or graphic form or medium providing "chat" and e-mail based on a text (Hosťovecký-Zaťková, 2011). Domestic and foreign universities conduct marketing activities on the Internet. Fabus, Juraj, Kremenova and Fabus Jozef (2014) followed marketing communication on the Internet.

The results of analyzes from the Slovak universities' web sites confirm the fact that even the Slovak academic environment is aware of the crucial role of the web in making the results of its activities available and in the visibility in the virtual information and communication space (Jedličková, 2010).

In the reviewed period, 28 responses were received from Slovak universities. The first question was directed to VC1: The way of web page creation (internal or external). The results are very similar when nearly half of the schools have created web pages internally and half externally (Table 2).

Table 2 **The way of web creation**

	Slovensko
Internal	46,40%
External	53,60%

Source: Own.

VC2: By evaluation of the usability of web sites, we found out that 28.6% of the Slovak universities evaluate the usability, 64.3% do not evaluate it and 7.1% do not know to answer the question (Table 3, Figure 1).

Table 3 **VC2: The web pages´ usability assessment**

	Slovakia
Evaluate	28,60%
Do not evaluate	64,30%
Do not know	7,10%

Source: Own.

Figure 1 **Web Usability Assessment - Left Results for SR**

Source: Own.

In this question, the respondents also answered what are the most common methods and tools for usability assessment, namely: user testing, A / B testing, questionnaire, and two schools also mentioned eyetracking. They also highlighted the issues that were revealed: "Little visibility on mobile devices, interface responsiveness, page orientation speed". Some schools responded that they did not identify any errors.

Table 4 shows the results of the last section and answers to the question whether they use Google Analytics data. Up to 64,3% of Slovak schools (who participated in the research) use the data and 35,7% do not use it.

Table 4 **VC3: Usability of Google Analytics data**

	Slovakia
Use	64,30%
Do not use	35,70%

Source: Own.

In complementary research, 23 secondary schools were addressed in the Žilina Region. In the period under review, we received 189 responses. Results were cleared by 12 responses (school staff and wrong students´ answers). We then worked with 177 responses. In remote user testing, we asked students to choose one of the universities in Slovakia, visit their website and try to find the offered study programs. 88% of pupils have found study programs, and nearly 12% have not found (Table 5, Figure 2).

Table 5 **Success of students when searching the study programs**

	Students
Found study program	88,10% (156)
Did not find study program	11,90% (21)

Source: Own.

Figure 2 **Graphic Assessment of Student Success in Searching for Study Programs**

The students who found the study program further evaluated how easy it was to find it, on a scale of 1 to 5, from very easy to very difficult. The results are shown in Figure 3.

Figure 3 **Graphic evaluation for searching the study programs**

Source: Own.

Students could also express their own opinion on the school's website. Here are some of the opinions: "The information is stored in documents and not directly on the page. It is not very clear. It is not very clear and it is difficult to find basic information. Therefore ... I did not find a study program.... the page was not user friendly ... a lot of text on one side ... The page was unclear, I did not find a suitable study plan .... Small font, too complicated. Too much news on the main page. Need to download a document with programs, unnecessarily complicated, no description of the programs. It's fine ... only the font is small. It could have a newer version of the graphics. It is cool, but some things have to look for longer. It is made simple and super. There are no pictures or information. I like it :) I found everything I needed, super. I like this school. I like design, and also very well provided information."

From the responses, it can be seen that a normal user can detect a number of usability errors and respond very sensitively to them, which subsequently affects his / her satisfaction with the given service interface.

The results of the usability assessment using the SUS method, which focuses on finding satisfaction, in our case of secondary school pupils with university websites in Slovakia, is as follows: The highest score was 85 points, the lowest 40 points, the average grade for all universities in Slovakia is 60.36 points, the median is 60, modus 54. The methodology says that all results below 68 points are below the level and above 68 points, above the level of usability (Galovicova, 2017).

It can be assessed that six websites of Slovak universities have reached an excessive level and the remaining 23 are under the average. More detailed interpretations of the results are considered with a scale that evaluates the level of usability of the interface as horrible (under 25 points), significantly weak (below 38 points), OK (below 52 points) – it was achieved by 5 schools, good (53 - 72 points) 20 schools,

excellent (73-84 points) – achieved by the 3 schools (with a small number of ratings: 1 or 2) and excellent (85 points and more) - one school (but only for one rating).

The research team of the Portal of Slovak Universities surveyed the content management systems - CMS at universities. Whole school CMS were considered, as well as, CMS used at particular faculties. The result is shown in the table.

Table 6 **CMS used at the universities**

CMS	*Whole school solution*	*Only faculties*
Contao	1	
DotNetNuke / DNN Platforl	1	
Drupal	4	4
Frontpage	1	
Joomla	4	7
Plone	1	1
Typo3	2	
WebGui		1
WordPress	4	2
custom	15	11

Source: Tothova, Orszaghova and Hornyak-Greganova, 2017.

Surprisingly, 15 universities resolve their CMS on contract through supplier. These are different CMS systems from different suppliers.

When using CMS, the User support is important. It means responsibility of the organization and operation of the IT infrastructure of each organization (Olahova, 2015).

4   Conclusion

The result of the research is an overview of the tools used to create university websites and the level of usability reached by university websites in Slovakia - up to 24 (83%) of university websites have achieved good level of usability (83%> 60%). Nevertheless, we believe that the results are not positive for Slovakia, because it is necessary to focus on the average of the results (68 points) that was reached only by 6 schools (21%), the remaining 23 (79%) achieved only sub-standard level. It is clear from the site administrators' replies that they often do not have sufficient knowledge, education or experience in the field of usability assessment, or due to a number of other obligations, they do not deal with this issue.

Websites of universities are based on diverse web content management systems, representing a diverse range of approaches to presenting information. All universities have mainly presented current events on the main sites, the possibility of studying either directly study programs or hyperlinks with more detailed information about them. Fortunately, they do not use modern technology not to enter content several times - into their academic information system, the Portal of Universities, and their website. This would eliminate, on the one hand, the various information presented, the errors caused by out-of-date content, but also the time of text editors.

Universities must be more careful about eliminating out-of-date content and links to non-existing documents at all locations in the site. This fact was confirmed by other authors too, Jedličková (2010), Šilerová et al. (2017), Tóthová, D.-Országhová, D. and Hornyák-Gregáňová, R. and others.

Acknowledgements

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INFORMATION SECURITY IN AGRARIAN SECTOR OF THE SLOVAK REPUBLIC

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Abstract

Every section of the national economy uses information and communication technologies for their activities, not excluding the agrarian sector. Although the agrarian sector in the Slovak Republic is less attractive for employment, there are still granges and small farmers who maintain the national tradition of agriculture. But for their better development and management they use modern information and communication technologies. These technologies can not only provide statistical information or keep records of increments, crops, etc. but also with their help work on fields is more efficient, e. g. with the help of drones. To keep these technologies in good condition the security of these technologies is important. This article is about information security, mostly the non-technical means, and oriented on granges of the Slovak Republic. The main focus is on information technologies, information systems and information assets used by these segments of the national economy. A questionnaire survey was conducted on granges of the Slovak Republic as a part of project KEGA (012SPU-4/2017) "Methodological manual processing Enterprise security policy" for mapping the current information security in this sector. The way of managing information and communication technologies is closely linked to the security of these technologies. There are some interesting differences between the management of ICT and their security – the way granges are interested in this topic. The risk analysis is directly connected with non-technical security means for

protecting ICT. These means are the Security Project and Security Policy documents. These documents contain the risk analysis to be performed in certain time intervals. The Security Policy contains every rule of protection of ICT and IS as other assets of a company. However, the Security Policy and the Security Project are the basic security means for assets of a company, only small number of companies and even granges develop, apply and adhere them.

Key words: *Agrarian sector, Information and Communication Technologies, Information Security, Security Policy*

JEL Classification: *O34, O39*

1   Introduction

Information technologies and data which we process and use with the help of these technologies are inseparable part of the national economy and individuals. Even at work or in private we use information and communication technologies, e.g. personal computers, smart phones, smart TV, etc. In private we are responsible for the security of our ICT as at work. One cannot rely on other person or some technology to protect him from information threats on used information technologies. These threats may be of a technological or physical nature. Most threats are from the Internet because internet connection is almost everywhere by WIFI networks, mobile networks or cable connection. It is also important to oversee the physical security of these technologies. The agrarian sector in the Slovak Republic also uses information technologies more often not only for data processing, but also for direct help at daily work, e.g. GPS when working in the fields, drones for land mapping, automatic feeders, etc. For this reason, these technologies must be protected also in this part of national economy. The article focuses in survey on the state of the information security.

Usage of information and communication technologies has a direct impact on the development and competitiveness of individuals, firms, production sectors, regions and even the whole continents. It is possible to state that the general characteristics and principles of ICT usage in the agriculture sector are beyond and doubt valid and will be valid in the future (Jarolímek and Vaněk, 2003).

Similar research was conducted on agrarian cooperatives by Montegut-Salla, Y., Cristóbal-Fransi, E., and Gómez-Adillón, M.J. (2013). They focused mostly on used information and communication technologies and Internet in agro-food cooperatives. The research addressed the following aspects: computer equipment, Internet connection and presence and the level of electronic commerce.

IS/ ICT assets include the technologies, applications, data and also people. Examples of the assets are hardware, software tools, data that the field of informatics uses and processes. It also includes the standardized and formalized processes and knowledge included in the informatics, as well as individuals – operational staff, managers of individual applications (Gála et al., 2006)

Development of information and communication technology also led to development in data visualization methods. There are many tools for monitoring of moving objects in agrarian sector, and also many different approaches on how to access and utilize location data. The suitability of given solution depends mostly on user requirements. Every user group has different demands and rights when operating software tools, especially GIS (geographic information system). (Pavlík, J., et al., 2015) These methods are not described in the paper, but there are important for the knowledge how ICT is used in agrarian sector and why do we need to protect these technologies.

For the enterprises of the agrarian sector also mechanisms of state are important to develop the communication systems in a country. The research of necessity of forming the complex of measures of the state effect on the development of innovations, where communication systems play the role of the information distribution environment, required for provision of the innovative activity of the enterprises of the agrarian sector, was conducted by Granate, A. (2014).

Information technologies are important also in more efficient product placement of agro-sector products, e.g. using neuroscience, eye-trackers, etc. Consumer neuroscience is a phenomenon that has become an important tool of marketing management when defining customer driven strategies. The aim of consumer neuroscience (neuromarketing research) is a better understanding of the principles of decision-making and the strategy of customer and consumer behaviour in economic processes through neuroimaging and biometric methods, psychological and neurobiological concepts and knowledge (Berčík et al., 2016).

According to before mentioned researches the use of ICT in agrarian sector develops. But not only the use of these technologies is crucial nowadays to be competitive. Sufficient information security of these technologies and information assets must be maintained.

The term information security is often used in the relation to the information provided. Information security can be defined as the protection of information and its critical elements, including the systems and hardware that use, store, and transmit that information (Whitman and Mattord, 2012).

The information security has become a complex managerial issue when following recent developments affecting the information security threat landscape. (Dor and Elovici, 2016)

Information assets are significant competitive and efficient sources of business in the globalizing knowledge economy. The significance of information security is therefore increasing (Mayadunne and Park, 2016).

It is difficult to define each level of information protection. Their vulnerability is on each level such as physical, organizational, procedural, personnel, management, administrative and also in terms of hardware and software (Oláhová, 2006).

Information security is not a management process that directly produces a profit, but it is a necessary prerequisite for direct profit making process. The aim of information security is to reduce the possibility of applying the threats and in case they appear it is to minimize their impact. Quality security management requires a combination of technical and business skills and knowledge of people, many of them are not intuitive. It is important to understand the information security as a complex process. Additionally, it is necessary to determine the correct security infrastructure, define the security policy and specially to analyse security risks (Hallová et al., 2017).

Also the analysis for security risks is important to provide knowledge of new dangers and threats for information assets, data and information systems. This analysis should be provided at regular intervals.

Analysis of security risks and their management is an essential tool in the hands of the senior management of the enterprise in order to protect investments in information systems, and thus to support the main business processes. Custom design of the risk analysis process can be distinguished by the details and depth of approaches to solve them. Based on the risk analysis, it is possible to specify the appropriate measures with regard to the identified threats (Hennyeyová, Tóthová, Hamášová, 2013).

Digital literacy is a necessity when we everyday use information technologies. This literacy or knowledge should not only by about how to use information technologies but also how to protect them and therefore the population must be taught about these technologies from childhood (Hosťovecký, Stubna, 2012).

With the topic of digital literacy of citizens also Polakovič et. al. (2016) deal with and their focus is on E-Government and E-inclusion. E-inclusion is a part of the process of social inclusion. Its aim is to create a European information society for all, as defined by strategic documents concerning the information society in the European Union.

2   Data and Methods

A questionnaire survey was conducted on granges of the Slovak Republic as a part of project KEGA (012SPU-4/2017) "Methodological manual processing

Enterprise security policy" for mapping the current information security in this sector. Aim of the research was mostly only on non-technical part of the information security – management of ICT in granges, management of security of ICT, risk analyses, security documents, staff awareness of security and threats to ICT, used security means in monitored granges. The survey was used in 149 granges in the Slovak Republic. Management of ICT points to who is responsible for ICT and IS – an internal employee; an internal employee and a cooperation with an external information company; the management of ICT is provided only by an external information company; the last opportunity of this question was that granges do not have management of their ICT. The second part was focused on the management of ICT security in granges with three possible options. Every grange provides some form of information security, whether by own employee or by external information security company. With the information security also risk analysis is related which means when granges provide risk analysis for information treats. This analysis must be provided when ICT/IS are used and granges work with sensitive data, e.g. wage data, personal information of employees, etc. The fourth part of the research focused on use of non-technical security means – security policy and security project – if granges use them, because granges also work with sensitive data of employees. Awareness of employees about information security and threats was the fifth part of research, because nowadays everyone must know the basics of information security because everyone of us uses information technologies also at home, not only in work. Perhaps the older generation does not as often as the younger generation. The last part of survey asks for used security means of ICT, information assets and property of granges.

3 Results and Discussion

Managing the information technologies in granges depends mostly on current employees who use them, because there are many job placements and not everyone uses these technologies for their daily work. Mostly the responsibility for these technologies is on the manager, in many cases on the chief economist. According to the research conducted on granges in the Slovak Republic the management of their information technologies is carried out by cooperation with an external company (55,47 %). Only 28,13 % of granges left their management of ICT exclusively on an external company and 6,25 % have their own internal employee – information manager. An alarming fact is that 10,16 % of granges do not have any ICT manager or do not cooperate with an external company. It is understandable that granges mostly cooperate with external companies when managing their ICT/IS, because it is more efficient from the economic view, e.g. lower costs for

own information technician. These findings are necessary for further research of the information security of the agrarian sector in the Slovak Republic.

Figure 1 **Management of Information and Communication Technologies in granges of the SR**

Source: Own processing.

The way of managing information and communication technologies is closely linked to the security of these technologies. There are some interesting differences between the management of ICT and their security – the way granges are interested in this topic. From the Figure 2 it can be seen that 71,88 % of granges cooperate with an external company for security of their ICT. More internal employees are also included for the security of ICT in their own companies (12,50 %). 15,62 % of granges leave their information security on an external company and do not have an employee to care about their information security. The security of ICT is of the utmost importance when sensitive data are processed. Also granges work with this kind of data – wage data, accounting, personal information of employees, and many more. Good news is that granges care for their ICT security. Using of special security means is part of the last part of research.

Figure 2 **Security of ICT in granges of the Slovak Republic**

Source: Own processing.

Although all granges ensure security of their information and communication technologies not all perform an analysis of potential security threats and risk for their ICT. An alarming 71,88 % of these granges do not provide this risk analysis. Risk analysis is important for a company to know which threats are dangerous for their data, information system or even for assets (not only information assets). This research focuses on information threats and therefore not providing a proper risk analysis for computer viruses, hacks, data and information thefts, etc. poses a serious risk to business data. Besides that, employees who are responsible for ICT/IS do not know how to protect or what security means do they have to use to protect their business data.

Figure 3 **Performing risk analysis for ICT**

Source: Own processing.

The risk analysis is directly connected with non-technical security means for protecting of ICT. These means are the security project and security policy documents. These documents contain the risk analysis to be performed in certain time intervals. The security policy contains ways of protection of ICT and IS as other assets as well as data flows of a specific company. However, the security policy and the security project are the basic security means for assets of a company, only small number of companies and even granges develop, applies and adhere them. The security policy document is a necessity for businesses which operate with sensitive data (as mentioned before). Mostly the responsibility for a security policy document has the chief economist of the grange. Or when a grange has a special employee for managing information technologies and their security, this person takes the responsibility to create, update this document and to familiarize employees with this document. This document contains basic information about the company (in this case a grange), information flows, who works with what form of data, what laws to follow, etc. When and information incident occurs this responsible person knows exactly who worked with the current technology.

Figure 4 **Security policy and security project as basic non-technical security means**

Source: Own processing.

Last but not the least are employees and their knowledge of security and information risks. Just the low existence of security documents leads to these low rates of knowledge. But nowadays people use ICT not only at work but also at home. Therefore, each one must be careful about the information security and have the basic knowledge about information threats, risk and security. Each employee must come with this knowledge to his workplace even if he/she works with ICT or not. From the Figure 5 it can be seen that the awareness of ICT security and threats to ICT of employees in granges is at very low rate.

Figure 5 **Staff awareness of security and threats to ICT**

Source: Own processing.

According to research that granges do not use the non-technical security means in sufficient extent, the calming fact is that they use technical security means, e.g. antivirus software, firewalls, passwords, etc. Antivirus software (AV) is a necessity in each computer and nowadays in smart phones. It is the basic technical security tool to protect IT and IS. Mostly the AV software has a package of security means – firewall, antispyware, protection of internet banking when logging into

it, anti-stealth protection and many others. It depends on current mark of the AV programme and financial resources of a company (grange). Other security means are mostly used for assets and information assets, e.g. computers, servers, etc. In very small numbers of granges electronic gatekeepers and employee monitoring are used. Use of passwords had to be used in every grange, but the number is lower – 87,5 %. It is strange, because in every grange they use computers and passwords are used not only for computer accounts but also when opening e-mail accounts. Also not every grange has a camera system to monitor the current area of a grange.

Figure 6 **Used security meansin monitored granges**

Source: Own processing.

4   Conclusion

According to the research it can be seen that the information security of granges in the Slovak republic is not on the highest level, but they do what they can according to their economic situation. It is important to have basically some technical protection means, e. g. antivirus software, etc. and a sufficient knowledge of IT security. Use of the non-technical protective means – security project and security policy, is also important, but there is hope in the future that these means will be used more often and some day in every grange of the Slovak Republic. In case that granges will exist in the future. The agrarian sector is important to ensure food security of each country and every country has to support this sector because food is priority of life.

Acknowledgements

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SESSION 11

INNOVATION SYSTEMS IN AGRICULTURE – SESSION ORGANIZED BY WITHIN THE PROJECT CATALYST "CAPACITY BUILDING IN AGRICULTURAL INNOVATION SERVICES IN CEE COUNTRIES"

CAUSAL RELATIONSHIP BETWEEN ECONOMIC GROWTH, TRANSPORT INFRASTRUCTURE AND INVESTMENT IN TRANSPORT INFRASTRUCTURE IN TRANSITION COUNTRIES

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Abstract

Provision and maintenance of adequate infrastructure facilities are necessary if there is need to achieve and sustain rapid economic growth. The availability of infrastructure like transport is vital for accelerated development and modernization of a country. Transport infrastructure in particular, is vital to the prosperity of regions. The contribution of our study refers to the investigation the relationship and causality between economic growth, transport infrastructure, investment in transport infrastructure, as in transition countries. To achieve this aim, we proposed the growth model. We use annual data of 25 transition countries (see Appendix 1) for the time period 1990-2013. The findings from GMM reveal that there is bidirectional causal relationship between repressors we have studied.

Keywords: *transportation, economic growth, investment, institutions*

JEL Classification: *F43, L9*

1   Introduction

Provision and maintenance of adequate infrastructure facilities are necessary if there is need to achieve and sustain rapid economic growth. The availability of infrastructure like transport is vital for accelerated development and modernization of a country. Availability of adequate infrastructure facilities is an important

pre-condition for sustainable economic and social development **(Hirschman, 1985)**. Improvements in infrastructural services such as transportation are essential for enhancing efficacy of the productive process and for raising productivity of any economic entity **(Patra and Acharya, 2011)**.

Transport infrastructure in particular, is vital to the prosperity of regions. First, it links residents with employment, public services, shopping or social networks, and businesses to labour, consumers, and suppliers **(Kirkpatrick, Parker and Zhang, 2004)**. Second transport infrastructure may increase productivity of existing inputs and/or decrease transport and production costs making the region more attractive for investors **(Pradhan and Baghi, 2013)**. Besides this, transport infrastructure affects economic growth through the aggregated demand.

Institutions can foster infrastructure investment and by this could have impact on economic output. Therefore, considering institutional indicators in our study is one of the crucial points. The degree of relationship between transport infrastructure and economic growth relation is vital for transport infrastructure strategy and policies in transition countries. Transition economies form an ideal set for study, as they have all been part of a natural experiment. Out of communism, they share a similar history. Moreover, they all faced the same shock as they abandoned communism and command economies; all inherited dysfunctional institutions. This shock and the following structural change cause a break between the levels of development (growth) and institutions **(Paakkonen, 2010)**.

The contribution of our study refers to the investigation the relationship and causality between economic growth, transport infrastructure, investment in transport infrastructure, as in transition countries. To achieve this aim, we proposed the growth model. We have used panel data approach. Generalized Method of Moments (GMM) estimation, and the instrument exogeneity tests are used to specify and estimate the model.

2 Literature Review

2.1 Transport Infrastructure in Transition Countries

Transport is the movement of people and goods from one location to another. Transport infrastructure facilitates that movement. It connects goods to markets, workers to industry, people to services and the poor in rural areas to urban growth centers. Transport infrastructure is developed to enhance the movement or to increase trade **(Bafoil and Ruiwen, 2010)**.

The responsibility of the development of transport infrastructure traditionally lies with the government of the country. However, often the development of

infrastructure is achieved in cooperation with the private sector. The role of the government is to supply the demand for infrastructure. Examples of the demand of infrastructure is "goods-to-market" and "raw materials-to-factories". The infrastructure should facilitate the movement of goods between the locations. If the location is outside the country, the infrastructure should be connected to transport models, which can facilitate such movement, such as seaports, airports, or dryports. In a global market where trade is determined by comparative advantages, it is in the country's interest to lower its transport cost, in order to increase its competitiveness. High transport costs will be an obstacle to trade and impede the realization of gains from trade liberalization **(ADB, 2008)**.

There exists a close relationship between infrastructure and transport costs. First it reduces direct transportation costs. Second, it lowers the time of transport, which indirectly reduces cost. Thirdly, it reduces risks. Finally, it provides access to new markets **(Nordas and Piermartini, 2004)**.

Various factors determine transport costs across countries: The geographical characteristics (such as the distance from major markets, access to oceans and the countries typography), the type of products that a country import/export, the degree of containerization of transport, the traffic on specific routes, the quality of the transport infrastructure, and the efficiency of related transport services **(UNESCAP, 2011)**.

Differences across countries in transport costs, including relative costs between different modes of transport, are a source of comparative advantage and affect the volume and composition of trade. For example a country with relatively lower air transport costs may have a comparative advantage in time-sensitive goods **(WTO, 2004)**.

Products with a high value-weigth ratio are mainly transported by air, whereas products with low value-weight ratio mainly are transported by water. In general agricultural and mining goods are more expensive shipping than manufacturing products **(Sønderskov, 2013)**.

When transition occurs, it traditionally indicates that the previous system did not work. This in turn means that the facilities most likely are outdated, including the transport infrastructure. Domestically it is important to connect the largest economic trade centers, and widen the infrastructure network to include as large a part of the country as possible. There is a need to maintain, repair and update already existing infrastructure routes, but also extend the existing network. At least it is necessary to engage in regional cooperation to develop infrastructure plans that can connect its infrastructure network to neighbouring countries. This can be achieved either by direct agreements between neighbouring countries or by multiparty cooperation between countries in a region to develop infrastructure

plans within a larger perspective. Infrastructure to facilitate trade between countries which markets have been neglected for decades, are expected to be in a poor state, either by poor quality or simply by missing links. It is important to recognize the most important links and complete those **(World Bank, 2010)**.

Transport infrastructure i.e. road, railway, and pipelines typically means domestic trade, and foreign trade with neighbouring countries. However, a connection to a cross-border infrastructure network gains access to not only market but also markets connected to network. The connection gives an indirect access to global markets. For example the case of East-Central Europe, where Poland's road and railway connection to Germany, also meant access to France, Netherlands, Italy, etc. Transport infrastructure such as seaports and airports provides direct opportunities in world markets, depending on the geographic location, sea access etc. In the case of Vietnam the development of their ports, helped facilitate trade in a wide range of markets, such as America and Europe. As with the development of roads and railways, it is important to look at regional infrastructure when developing seaports and airports. Furthermore, the interdependence of the different kind of infrastructure is important. If large port is not connected to sufficient roads and/or railway facilities and their respective networks it will have a very limited purpose.

The quality of the transport networks reflects a number of factors, including their initial design. For example, in the Baltics the major trunk roads run east to west rather than north to south. The trunk roads in the former Soviet Union were also designed for lower vehicle weights than in the EU, although this is consistent with the traffic tasks which they had to perform in the past. With respect to railways, design standards are less exacting than those in the EU. However, most rail lines have adequate speeds and are of a sufficient standard for the majority of rail freight services currently provided **(GASPARD, 1996)**.

2.3 The Link between Transport Infrastructure and Economic Growth

Transport infrastructure is the basic infrastructure to national economy. The utilization of natural resources and the development of regional economy are heavily relying on it. Among specific ways that government contributes to total economic output and promote economic growth is The investment of public capital to transport infrastructure.

There have been numerous studies on the transport infrastructure and economic development related issues in the past decades. All the studies detect an effect of investments in infrastructure and economic growth. However, the views differ with respect to the size of this effect. The first studies dealing with this topic,

revealed that transport acts as a necessary condition for the growth to occur. **Aschauer (1989)** was one of the first estimating the macro effect of infrastructure investment on American economy. He found a strong impact of infrastructure capital on aggregate total factor productivity. Many researchers followed his work. The results of these first studies suggested high returns of infrastructure investment. However these studies were later on criticized by other authors for unrealistic results **(Gramlich 1994)**. Contrary to high estimates in these first studies, later results were predicting impacts that are more moderate. They explained that a first shock in infrastructure could cause great effect, but after the basic infrastructure was constructed, new investment would not cause much effect **(Huang and Harata, 2010)**. According to **Banister** and **Berechman (2001)**, it is widely agreed that the economic growth happens mainly due to capital, labor, etc. and only partly relying on the infrastructure improvement.

Canning and **Pedroni(1999)** used Granger causality test between investments in three types of economic infrastructure i.e., kilometers of paved road, kilowatts of electricity generating capacity, and number of telephones based on data from a panel of 67 countries for the period 1960-1990. They found strong evidence of causality running in both directions between each of the three infrastructure variables and GDP among a significant number of the countries investigated. **Demurger (2001)** used panel data from a sample of 24 Chinese provinces throughout the 1985 to 1998 period. She estimated a growth model and found out that transport facilities are a key differentiating factor in explaining the growth gaps.

Canning and **Pedroni (2004)** used panel cointegration technique and found that in general both short run and long run causality is bi-directional, with infrastructure responding to GDP per capita but GDP per capita also responding to infrastructure shocks. **Herranz-Loncan(2007)** analysed the impact of infrastructure investment on Spanish economic growth using VAR system. His paper showed that investment in local scope infrastructure exerted a clearly positive impact on Spanish economic growth between 1850 and 1935. **Pradhan** and **Bagchi (2013)** used Vector Error Correction Model to examine the effect of transport (road and rail) infrastructure on economic growth in India over the period 1970-2010. They found that transport infrastructure not only influences economic growth but also gross capital formation. **Kumo (2012)** conducted pairwise Granger causality tests between economic growth, economic infrastructure investment, and employment in South Africa for the period 1960-2009 using bivariate vector autoregression (VAR) model with and without a structural break. His results indicate a strong causality between economic infrastructure investment and GDP growth that runs in both directions.

3 Methodological Framework

According to objectives of our study, we have used growth model approach to explain the interrelationship between transport infrastructure, investment in transport infrastructure and economic growth (objective 1), where economic growth depends on transport infrastructure, investment in infrastructure and other inputs. The model framework helps us to explore the three-way linkage between the variables: transport infrastructure, investment in infrastructure and economic growth. These variables are in fact endogenous. It is therefore worth investigating the interrelationships between the three variables by considering them simultaneously in a modelling framework. Our proposed model, takes the following form:

$$GDP = \int(ITP, RRGT, RRPC, RRNL, GCF, L) \text{ (1)}$$

This essentially states that *GDP* is a function of investment in transport infrastructure with private participation (*ITPP*), gross capital formation (*GCF*), labour force (*L*), roads and rail goods transported in million ton per km (*RRGT*), roads and rail passengers carried in million passengers per km (*RRPC*), and roads and rail network length in km (*RRNL*).

We can rewrite Eq. (1) in growth form as follows:

$$Y_{i,t}^{'} = \beta_0 + \beta_1 ITPP_{i,t} + \beta_2 RRGT_{i,t} + \beta_3 RRPC_{i,t} + \beta_4 RRNL_{i,t} + \beta_1 GCF_{i,t} + \beta_1 L_{i,t} + u_{it} \text{ (2)}$$

where the subscript $i=1,…,N$ denotes the country and $t=1,…,T$ denotes the time period. *Y'* represents growth rate of GDP; *GCF* represents the gross capital formation; *L* represents the total labour force; *ITPP* indicates investment in transport infrastructure with private participation; *RRGT* indicates roads and rail goods transported; *RRPC* indicates roads and rail passengers carried; *RRNL* indicates roads and rail network length.

4 Time Series Analyses

4.1 Panel Unit Root Tests

Panel unit root tests are used to examine the degree of integration between the variables and to assess the stationarity properties of the variables. In this study we have used seven different panel unit root tests including LLC test proposed by **Levin, Lin** and **Chu (2002)** IPS test proposed by **Im,Pesaran** and **Shin (2003)**, Fisher-type tests using ADF and PP tests of **Maddala** and **Wu (1999)** and **Choi (2001)**, **Breitung (2000)** and **Hadri (2000)**.

4.2   Panel Cointegration Tests

Cointegration implies the existence of a long-run relationship between variables. The principle of testing for cointegration is to test whether two or more integrated variables deviate significantly from a certain relationship **(Abadir and Taylor, 1999)**.

In our empirical analysis, we used two sets of cointegration test methods. The first set of tests is **Pedroni (2004)**. The second set of tests is **Kao (1999)**, which is based on the Engle-Granger two-step procedure and imposes homogeneity on the members in the panel and is a generalization of the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests in the context of panel data.

4.3   Generalized Method of Moments (GMM) Estimation Technique

We later transform the growth model into regression equations in order to treat simultaneously our variables as endogenous. On this basis, we use the following simultaneous equations model to investigate the interrelationship between transport infrastructure indicators, investment in transport infrastructure with private participation, gross capital formation, labour force, and economic growth. The linkages between these variables are empirically examined by making use of the following equations:

$$Y'_{it} = a_0 + a_1\ ITPP_{it} + a_2\ RRGT_{it} + a_3\ RRPC_{it} + a_4\ RRNL_{it} + a_5\ GCF_{it} + a_6 L_{it} + a_7 FD_{it} + \varepsilon_{it} \quad (3a)$$

$$ITPP_{it} = \beta_0 + \beta_1\ Y'_{it} + \beta_2\ RRGT_{it} + \beta_3\ RRPC_{it} + a_4\ RRNL_{it} + \beta_5\ GCF_{it} + \beta_6 L_{it} + \beta_7 EBRD_{it} + \varepsilon_{it} \quad (3b)$$

$$RRGT_{it} = \varphi_0 + \varphi_1\ Y'_{it} + \varphi_2\ ITPP_{it} + \varphi_3\ RRPC_{it} + \varphi_4\ RRNL_{it} + \varphi_5\ GCF_{it} + \varphi_6 L_{it} + \varphi_7 EBRD_{it} + \varphi_8 FD_{it} + \varphi_9 TP_{it} + \varepsilon_{it} \quad (3c)$$

$$RRPC_{it} = \xi_0 + \xi_1\ Y'_{it} + \xi_2\ ITPP_{it} + \xi_3\ RRGT_{it} + \xi_4\ RRNL_{it} + \xi_5\ GCF_{it} + \xi_6 L_{it} + \xi_7 EBRD_{it} + \xi_8 FD_{it} + \xi_9 TP_{it} + \varepsilon_{it} \quad (3d)$$

$$RRNL_{it} = \gamma_0 + \gamma_1\ Y'_{it} + \gamma_2\ ITPP_{it} + \gamma_3\ RRGT_{it} + \gamma_4\ RRPC_{it} + \gamma_5\ GCF_{it} + \gamma_6 L_{it} + \gamma_7 EBRD_{it} + \gamma_8 FD_{it} + \gamma_9 TP_{it} + \varepsilon_{it} \quad (3e)$$

Equation (3a) states that investment in transport infrastructure with private participation (*ITPP*), transport infrastructure, and other variables, namely, gross capital formation (*GCF*), labour force (*L*), and financial development (*FD*) can potentially determine economic growth. Equation (3b) states that economic growth (*Y'*), transport infrastructure (*RRGT, RRPC, RRNL*) and other variables, namely, gross capital formation (*GCF*), labour force (*L*), institutions (*EBRD*), can potentially affect investment in transport infrastructure with private participation (*ITPP*). Equation (3c) suggests that economic growth (*Y'*), investment in transport infrastructure with private participation (*ITPP*), rail and road passenger carried and network length (*RRPC* and *RRNL*), gross capital formation (*GCF*),

labour force (L), and financial development (FD) and total population (TP) can potentially affect RRGT. Equation (3d) suggests that economic growth (Y), investment in transport infrastructure with private participation ($ITPP$), rail, and road goods transported and network length ($RRGT$ and $RRNL$), gross capital formation (GCF), labour force (L), and financial development (FD) and total population (TP) can potentially affect RRPC. And similarly, equation (3e) suggests that economic growth (Y'), investment in transport infrastructure with private participation ($ITPP$), rail and road goods transported and passenger carried ($RRGT$ and $RRPC$), gross capital formation (GCF), labour force (L), and financial development (FD) and total population (TP) can potentially affect RRNL.

As it is mentioned above for growth model we have employed a dynamic panel data approach in a simultaneous-equations with lagged levels of economic growth, ITPP, and infrastructure variables by using the **Arellano** and **Bond (1991)** GMM estimator. For the growth model, our proposed modelling is as follows:

$$Y'_{it} = a_0\, Y_{i,t-1} + \varphi ITPP_{i,t} + \varphi RRGT_{it} + \varphi RRPC_{it} + \varphi RRNL_{it} + \beta X_{i,t} + \mu_{i,t} + \varepsilon_{it} \quad (4a)$$

$$ITPP_{it} = \varphi_0\, ITPP_{i,t-1} + \psi Y'_{it} + \psi\, RRGT_{it} + \psi\, RRPC_{i,t} + \psi\, RRNL_{i,t} + \beta X_{i,t} + \mu_{i,t} + \varepsilon_{it} \quad (4b)$$

$$RRGT_{it} = \xi_0 RRGT_{i,t-1} + \sigma ITPP_{i,t} + \sigma Y'_{i,t} + \sigma\, RRPC_{i,t} + \sigma RRNL_{i.t} + \beta X_{i,t} + \mu_{i,t} + \varepsilon_{it} \quad (4c)$$

$$RRPC_{it} = \rho_0 RRPC_{i,t-1} + \gamma ITPP_{i,t} + \gamma Y'_{i,t} + \gamma RRGT_{i,t} + \gamma RRNL_{i,t} + \beta X_{i,t} + \mu_{i,t} + \varepsilon_{it} \quad (4d)$$

$$RRNL_{it} = \xi_0 RRNL_{i,t-1} + \nu ITPP_{i,t} + \nu Y'_{it} + \nu RRGT_{i,t} + \nu RRPC_{i,t} + \beta X_{i,t} + \mu_{i,t} + \varepsilon_{it} \quad (4e)$$

$$i=1,\dots,N; \quad t=1,\dots,T$$

Where Y'_{it}, $ITPP_{it}$, $RRGT_{it}$, $RRPC_{it}$ and $RRNL_{it}$ represent the GDP, investment in transport infrastructure with private participation and transport infrastructure of country i at time t, respectively. a_0 is the parameter to be estimated. X is a vector of core explanatory variables used to model economic growth (GCF, labour force and financial development), to model investment in transport infrastructure with private participation (GCF, labour force, institutional indicator) and to model transport infrastructure (GCF, labour force, institutional indicator total population, and financial development). φ captures the effect of ITPP and transport infrastructure on economic growth; ψ captures the effects of economic growth and transport infrastructure on ITPP and so on. μ is country-specific effect and ε is the error term. Then the lagged dependent variables ($Y'_{i,t-1}$, $ITPP_{i,t-1}$, $RRGT_{i,t-1}$, $RRPC_{i,t-1}$, $RRNL_{i,t-1}$) are correlated with the error term, the use of panel Ordinary least squares (OLS) estimator (with fixed and random effects) is problematic. The **Arellano** and **Bond (1991)** approach solves this problem by first differentiating the above equations.

5   Data

We use annual data of 25 transition countries (see Appendix 1) for the time period 1990-2013. All the data are obtained from the World Bank, World Development Indicators, WDI, 2014. Our panel data set is unbalanced since we do not have complete information for all countries over the sample period.

The annual data on gross domestic product (GDP) in constant 2005 US dollars are used as a proxy for economic growth (Y'), road, and railway transport, which are: RRGT is roads and rail goods transported (million ton-km), RRPC is roads and rail passengers carried (million passenger per km), and RRNL is roads and rail network length (km). These variables are used as a proxy for transport infrastructure. Investment in transport infrastructure with private participation (ITPP) (current US dollars) and gross capital formation (GCF) in constant 2005 US dollars are used. L represents total labour force (percentage of total population). Financial development (FD) (total credit to private sector as a ratio of GDP) and total population (TP) in thousands are used. The institutional quality variable is represented through the European Bank for Reconstruction and Development indicator (Appendix 2). All variables are transformed into natural logarithms and have been processed using EViews 8 statistical program.

6   Empirical Results

6.1   Panel Unit Root Tests Results

Before the own analysis we had to check the nature of time series used. To test the stationarity of our time series we have applied different unit root tests. In Table 1 the results of the LLC, IPS, Fisher-ADF, and Fisher-PP, Breitung and Hadri panel unit root tests for each of the variables are presented. We have performed each test for the level and first difference.

Table 1 **Panel Unit Root Test Results**

							Null: No unit root	
Null: unit root								Heteroscedastic consistent Z-stat
Methods Variables		LLC	Breitung t-stat	IPS	Fisher-ADF	Fisher-PP	Hadri Z-stat	
Level	Y'	-1.809	1.580	2.810	54.018	76.997	8.189***	5.873***
	ITPP	-4.085	0.081	-1.471	16.213	15.791	9.643***	11.003***
	RRGT	0.404	0.337	3.257	38.518	34.187	8.410***	7.732***
	RRPC	1.185	0.142	2.988	21.105	29.138	7.635***	4.448***
	RRNL	-3.165	0.511	1.874	31.025	33.741	6.026***	5.753**
	GCF	-0.108	0.831	0.120	68.731	82.221	11.286***	12.619***
	L	-2.421	3.292	-0.063	75.923	48.792	11.387***	10.769***
	EBRD	-3.476	0.987	-1.627	58.011	35.203	12.524***	12.006***
	FD	0.597	3.703	2.323	30.480	33.481	7.856***	7.463***
	TP	9.598	-1.293	-1.478	56.861	65.344	11.259***	9.570***
First difference	ΔY'	+16.511***	-4.499***	-15.042***	290.865***	271.865***	0.511	0.345
	ΔITPP	-6.472***	-0.304*	-7.504***	26.081***	263.412***	0.49	0.949
	ΔRRGT	-15.846***	-7.763***	-9.732***	226.045***	271.562***	0.825	0.131
	ΔRRPC	-15.267***	-5.395***	-18.264***	445.349***	567.915***	0.095	-0.264
	ΔRRNL	-13.295***	-4.427***	-20.296***	226.872***	208.521***	-0.218	1.571
	ΔGCF	-13.082***	-6.189***	-12.729***	276.347***	294.926***	1.541	-0.915
	ΔL	-8.501***	-5.524***	-5.596***	200.646***	225.921***	0.307	-0.941
	ΔEBRD	-11.528***	-3.762***	-11.302***	249.577***	340.060***	-1.367	0.230
	ΔFD	-6.374***	+1.775**	-2.401***	66.730***	129.220***	2.232	1.578
	ΔTP	-4.294***	-3.062**	6.939***	173.378***	132.409**	-1.281	0.491

Source: Own elaboration.

Notes: Δ denotes the first difference. The optimal lag length is selected automatically using the Schwarz information criteria
*** Indicate that the parameters are significant at the 1% level
 ** Indicate that the parameters are significant at the 5% level.
* Indicate that the parameters are significant at the 10 % level

Y' - Economic Growth, ITPP - Investment in Transport Infrastructure with Private Participation, RRGT Roads and Rail Goods Transported, RRPC Roads and Rail Passengers Carried, RRNL Roads and Rail Network Length, GCF Gross Capital Formation, L Labour Force, EBRD European Bank for Reconstruction and Development Indices, FD Financial Development, TP Total Population

For the variables in level form, the null hypothesis is not rejected for the IPS LLC, Breitung tests, Fisher-ADF, and Fisher-PP tests, while the Hadri test rejects the null hypothesis at the 1% significance level for almost all variables. After taking the first difference, the first five tests reject the null hypothesis almost at the 1% significance level. So, we can conclude that all variables (in first differences) are stationary and integrated of order one or I(1).

The null hypothesis is that the variable follows a unit root process, except for the Hadri Z-stat and the Heteroscedastic Consistent Z-stat. Probabilities for the Fisher-type tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

6.2   Panel Cointegration Tests Results

For the robustness check, this study used two kinds of panel cointegration tests, i.e. Pedroni's (2004) and Kao's (1999) tests. Table 2 reports the within and between dimension results of the panel cointegration tests. As shown in Table 2, the results of Pedroni's (2004) heterogeneous panel tests indicate that the null hypothesis of no cointegration can be rejected at the 1% and 5% significance levels except for the panel pp-statistic and the group pp-statistic. Most of the tests reject the null hypothesis and it means the variables are cointegrated.

Table 2 **Pedroni Residual Cointegration Test Results (Y' as dependent variable)**

	Statistics	Probability
Within dimension		
Panel v-Statistic	1.655***	0.001
Panel rho-Statistic	1.126***	0.004
Panel PP-Statistic	-1.155	0.123
Panel ADF-Statistic	-1.183**	0.051
Between dimension		
Group rho-Statistic	1.765***	0.004
Group PP-Statistic	0.482	0.685
Group ADF-Statistic	-1.614**	0.054

Source: Own elaboration.

Notes: The null hypothesisis that the variables are not cointegrated.Under the null tests,all the statistics are distributed as normal(0,1).
*** Indicate that the parameters are significant at the 1% level.
** Indicate that the parameters are significant at the 5 % level

Beside the Pedroni cointegration tests we applied the test proposed by Kao (1999) to check the robustness of our results. Table 3 reports the results of Kao's (1999) residual panel cointegration tests, which reject the null hypothesis of no cointegration at the 1% significance level.

Table 3 **Kao's Residual Cointegration Test Results (Y' as dependent variable)**

	t-statistic	**Probability**
ADF	-2.911***	0.00

Source: Own elaboration.

Note: The ADF is the residual-based ADF statistic (Kao, 1999).
*** Indicates that the parameters are significant at the 1% level

Thus, we conclude that there is a panel long-run equilibrium relationship among variables, meaning that variables of economic growth, investment in transport infrastructure with private participation and transport infrastructure move together in the long run.

6.4 Dynamic GMM Results

The results of the GMM estimation are reported in Table 4. In model 1, we have found that investment in transport infrastructure and transport infrastructure have positive and statistically significant effects on economic growth. The magnitude of 0.441 and 0.227, 0.361, 0.251 implies that 1% increase in the investment in transport infrastructure and transport infrastructure increases the economic growth of transition countries by 0.44% and 0.23%, 0.36%, 0.25% respectively. Capital stock (GCF) is also statistically significant determinant of economic growth, while labour is statistically insignificant and financial development has negative effect on economic growth.

Table 4 **Dynamic GMM Results**

Inde-pendent Variables	Model 1 Y'	Model 2 ITPP	Model 3 RRGT	Model 4 RRPC	Model 6 RRNL
Y'	-	0.197** (0.02)	0.277**(0.03)	0.249***(0.00)	0.167***(0.00)
ITPP	0.441***(0.00)	-	0.446***(0.00)	0.204**(0.03)	0.267**(0.03)
RRGT	0.227***(0.00)	0.112(0.23)	-	0.152(0.21)	0.318**(0.03)
RRPC	0.361***(0.00)	0.125(0.35)	0.064(0.56)	-	0.430***(0.00)
RRNL	0.251***(0.00)	0.092**(0.02)	0.201**(0.02)	0.210**(0.04)	-
GCF	0.161*(0.03)	0.207*(0.06)	0.194**(0.04)	0.567**(0.04)	0.194*(0.04)
L	0.113 (0.146)	0.034(0.62)	0.115(0.34)	0.164(0.11)	0.099(0.12)
FD	-0.187*(0.07)	-	0.186**(0.04)	0.199*(0.07)	0.342**(0.02)

Inde-pendent Variables	Model 1 Y'	Model 2 ITPP	Model 3 RRGT	Model 4 RRPC	Model 6 RRNL
EBRD	-	-0.195*(0.06)	0.349***(0.00)	0.199*(0.07)	0.189*(0.09)
TP	-	-	0.164*(0.06)	0.419**(0.03)	0.189*(0.09)
Number of Oservation	600	520	600	600	600
Tests					
Hausen	21.66	22.19	26.19	19.39	24.82
AR(2)	0.205	0.098	0.118	0.675	0.199

Source: Own elaboration.

Note: Values in parentheses are the estimated p-values
Hansen J-test – over identification test of restrictions in GMM estimation
AR2 test – Arellano-Bond's test to analyze the existence of 2nd order autocorrelation in first differences.
*, ** and *** indicate significance at 10%, 5% and 1%

Y' - Economic Growth, ITPP - Investment in Transport Infrastructure with Private Participation, RRGT Roads and Rail Goods Transported, RRPC Roads and Rail Passengers Carried, RRNL Roads and Rail Network Length, GCF Gross Capital Formation, L Labour Force, EBRD European Bank for Reconstruction and Development Indices, FD Financial Development, TP Total Population

In model 2, we have found that the effect of economic growth and one variables of transport infrastructure (RRNL) are positive and statistically significant at the 5% level. The magnitude of 0.197 and 0.092 implies that a 1% increase in economic growth and RRNL increases the investment in transport infrastructure by around 0.10%. GCF is also statistically significant determinant of investment in transport infrastructure, while labour remains statistically insignificant and EBRD indicator has negative effect. In model 3, we have found that the effects of economic growth, investment in transport infrastructure and RRNL are positive and statistically significant at the 5%, 1%, and 5% levels, respectively. The magnitude of 0.277, 0.446, and 0.201 implies that a 1% increase in economic growth, investment in transport infrastructure and RRNL increases the RRGT by 0.27%, 0.45% and 0.20%, respectively. This means that an increase in economic growth, investment in transport infrastructure and RRNL tends to more goods transported by rail and roads. In model 4, we have approximately the same picture like in model 3. The effects of economic growth, investment in transport infrastructure

and RRNL are positive and statistically significant. Financial development, GCF, EBRD indicator, and population are also positive significant, while labour force is positive insignificant. Finally, in model 5, we have found that economic growth, investment in transport infrastructure, RRGT, RRPC are positive and statistically significant at the 1%, 5% ,5% and 1% levels, respectively. GCF, FD, EBRD indicator, and population are also statistically significant determinants of RRNL, but labour force is statistically insignificant.

In addition, the findings reveal that there is bidirectional causal relationship between economic growth and investment in transport infrastructure, and between economic growth and transport infrastructure. There is also uni-directional causal relationship from investment in transport infrastructure to transport infrastructure. Based on these findings we may conclude that the first, second and third hypotheses were confirmed.

7   Conclusion

The aim of our study was to find the relationship among economic growth, transport infrastructure and investment in transport infrastructure with private participation; economic output, infrastructure index and institution quality in transition countries.

Economic growth is important for all countries in addition, for transition countries, it bears a crucial importance. The transition from a planned-economy to an open market economy is considered to be one of the factors of transition countries. Twenty-five transition countries have been studied.

While empirically evaluating growth model we have used unit root tests and found that all variables (in first differences) are stationary and integrated of order one. For robustness check, we have performed the panel cointegration test and we have found that there is a panel long-run equilibrium relationship among variables, meaning that variables move together in the long run. The findings from GMM reveal that there is bidirectional causal relationship between economic growth and investment in transport infrastructure, and between economic growth and transport infrastructure. Therefore, investment in transport infrastructure and increase in quantity and quality of transport infrastructure induce the economic growth and this relationship is mutual. There is also unidirectional causal relationship from investment in transport infrastructure with private participation to transport infrastructure.

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Appendixes

Appendix 1 List of Transition Countries

Table 1 **List of Transition Countries**

	Country		Country
1	Albania	19	Romania
2	Armenia	20	Russia
3	Azerbaijan	21	Serbia
4	Belarus	22	Tajikistan
5	Bosnia and Herz.	23	Turkmenistan
6	Bulgaria	24	Ukraine
7	Croatia	25	Uzbekistan
8	Estonia		
9	Georgia		
10	Kazakhstan		
11	Kosovo		
12	Kyrgizstan		
13	Latvia		
14	Luthiania		
15	Macedonia		
16	Moldova		
17	Mongolia		
18	Montenegro		

Appendix 2 Transition Indicators Methodology (EBRD)

The transition indicator scores reflect the judgment of the EBRD's Office of the Chief Economist about country-specific progress in transition. The scores are based on the following classification system, which was originally developed in the 1994 Transition Report, but has been refined and amended in subsequent reports.

"+" and "-" ratings are treated by adding 0.33 and subtracting 0.33 from the full value. Averages are obtained by rounding down, for example. a score of 2.6 is treated as 2+, but a score of 2.8 is treated as 3-.

Overall transition indicators

Large-scale privatisation

1 Little private ownership.

2 Comprehensive scheme almost ready for implementation; some sales completed.

3 More than 25 per cent of large-scale enterprise assets in private hands or in the process of being privatised (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance.

4 More than 50 per cent of state-owned enterprise and farm assets in private ownership and significant progress with corporate governance of these enterprises.

4+ Standards and performance typical of advanced industrial economies: more than 75 per cent of enterprise assets in private ownership with effective corporate governance.

Small-scale privatisation

1 Little progress.

2 Substantial share privatised.

3 Comprehensive programme almost ready for implementation.

4 Complete privatisation of small companies with tradable ownership rights.

4+ Standards and performance typical of advanced industrial economies: no state ownership of small enterprises; effective tradability of land.

Governance and enterprise restructuring

1 Soft budget constraints (lax credit and subsidy policies weakening financial discipline at the enterprise level); few other reforms to promote corporate governance.

2 Moderately tight credit and subsidy policy, but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.

3 Significant and sustained actions to harden budget constraints and to promote corporate governance effectively (for example, privatisation combined with tight credit and subsidy policies and/or enforcement of bankruptcy legislation).

4 Substantial improvement in corporate governance and significant new investment at the enterprise level, including minority holdings by financial investors.

4+ Standards and performance typical of advanced industrial economies: effective corporate control exercised through domestic financial institutions and markets, fostering market-driven restructuring.

Price liberalisation

1 Most prices formally controlled by the government.

2 Some lifting of price administration; state procurement at non-market prices for the majority of product categories.

3 Significant progress on price liberalisation, but state procurement at non-market prices remains substantial.

4 Comprehensive price liberalisation; state procurement at non-market prices largely phased out; only a small number of administered prices remain.

4+ Standards and performance typical of advanced industrial economies: complete price liberalisation with no price control outside housing, transport and natural monopolies.

Trade and foreign exchange system

1 Widespread import and/or export controls or very limited legitimate access to foreign exchange.

2 Some liberalisation of import and/or export controls; almost full current account convertibility in principle, but with a foreign exchange regime that is not fully transparent (possibly with multiple exchange rates).

3 Removal of almost all quantitative and administrative import and export restrictions; almost full current account convertibility.

4 Removal of all quantitative and administrative import and export restrictions (apart from agriculture) and all significant export tariffs; insignificant direct involvement in exports and imports by ministries and state-owned trading companies; no major non-uniformity of customs duties for non-agricultural goods and services; full and current account convertibility.

4+ Standards and performance norms of advanced industrial economies: removal of most tariff barriers; membership in WTO.

Competition policy

1 No competition legislation and institutions.

2 Competition policy legislation and institutions set up; some reduction of entry restrictions or enforcement action on dominant firms.

3 Some enforcement actions to reduce abuse of market power and to promote a competitive environment, including break-ups of dominant conglomerates; substantial reduction of entry restrictions.

4 Significant enforcement actions to reduce abuse of market power and to promote a competitive environment.

4+ Standards and performance typical of advanced industrial economies: effective enforcement of competition policy; unrestricted entry to most markets.

Banking reform and interest rate liberalisation

1 Little progress beyond establishment of a two-tier system.

2 Significant liberalisation of interest rates and credit allocation; limited use of directed credit or interest rate ceilings.

3 Substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; full interest rate liberalisation with little preferential access to cheap refinancing; significant lending to private enterprises and significant presence of private banks.

4 Significant movement of banking laws and regulations towards BIS standards; well-functioning banking competition and effective prudential supervision; significant term lending to private enterprises; substantial financial deepening.

4+ Standards and performance norms of advanced industrial economies: full convergence of banking laws and regulations with BIS standards; provision of full set of competitive banking services.

Securities markets and non-bank financial institutions

1 Little progress**.**

2 Formation of securities exchanges, market-makers and brokers; some trading in government paper and/or securities; rudimentary legal and regulatory framework for the issuance and trading of securities.

3 Substantial issuance of securities by private enterprises; establishment of independent share registries, secure clearance and settlement procedures, and some protection of minority shareholders; emergence of non-bank financial institutions (for example, investment funds, private insurance and pension funds, leasing companies) and associated regulatory framework.

4 Securities laws and regulations approaching IOSCO standards; substantial market liquidity and capitalisation; well-functioning non-bank financial institutions and effective regulation.

4+ Standards and performance norms of advanced industrial economies: full convergence of securities laws and regulations with IOSCO standards; fully developed non-bank intermediation.

Infrastructure reform

The ratings are calculated as the average of five infrastructure reform indicators covering electric power, railways, roads, telecommunications, water and waste water. The classification system used for these five indicators is detailed below.

Electric power

1 Power sector operates as government department with few commercial freedoms or pressures. Average prices well below costs, with extensive cross-subsidies. Monolithic structure, with no separation of different parts of the business.

2 Power company distanced from government, but there is still political interference. Some attempt to harden budget constraints, but effective tariffs are low. Weak management incentives for efficient performance. Little institutional reform and minimal, if any, private sector involvement.

3 Law passed providing for full-scale restructuring of industry, including vertical unbundling through account separation and set-up of regulator. Some tariff reform and improvements in revenue collection. Some private sector involvement.

4 Separation of generation, transmission and distribution. Independent regulator set up. Rules for cost-reflective tariff-setting formulated and implemented. Substantial private sector involvement in distribution and/or generation. Some degree of liberalisation.

4+ Tariffs cost-reflective and provide adequate incentives for efficiency improvements. Large-scale private sector involvement in the unbundled and well-regulated sector. Fully liberalised sector with well-functioning arrangements for network access and full competition in generation.

Railways

1 Monolithic structure operated as government department, with few commercial freedoms. No private sector involvement and extensive cross-subsidisation.

2 Rail operations distanced from state, but weak commercial objectives. Some business planning, but targets are general and tentative. No budgetary funding of public service obligations. Ancillary businesses separated, but little divestment. Minimal private sector involvement.

3 Commercial orientation in rail operations. Freight and passenger services separated and some ancillary businesses divested. Some budgetary compensation available for passenger services. Improved business planning with clear investment and rehabilitation targets, but funding unsecured. Some private sector involvement in rehabilitation and/or maintenance.

4 Railways fully commercialised, with separate internal profit centres for freight and passenger services. Extensive market freedoms to set tariffs and investments. Implementation of medium-term business plans. Ancillary industries divested. Private sector participation in freight operation, ancillary services and track maintenance.

4+ Separation of infrastructure freight and passenger operations. Full divestment and transfer of asset ownership implemented or planned, including infrastructure and rolling stock. Rail regulator established and access pricing implemented.

Roads

1 Minimal degree of decentralisation and no commercialisation. All regulatory, road management and resource allocation functions centralised at ministerial level. New investments and road maintenance financing dependent on central budget allocations. Road user charges not based on the cost of road use. Road construction and maintenance undertaken by public construction units. No public consultation in the preparation of road projects.

2 Moderate degree of decentralisation and initial steps in commercialisation. Road/highway agency created. Improvements in resource allocation and public procurement. Road user charges based on vehicle and fuel taxes, but not linked to road use. Road fund established, but dependent on central budget. Road construction and maintenance undertaken primarily by corporatised public entities, with some private sector participation. Minimal public consultation/participation on road projects.

3 Fair degree of decentralisation and commercialisation. Regulation and resource allocation functions separated from road maintenance and operations. Level of vehicle and fuel taxes related to road use. Private companies able to provide and operate roads under negotiated commercial contracts. Private sector participation in road maintenance and/or through concessions to finance, operate and maintain parts of highway network. Limited public consultation/participation and accountability on road projects.

4 Large degree of decentralisation. Transparent methodology used to allocate road expenditures. Track record in competitive procurement of road design, construction, maintenance and operations. Large-scale private sector participation in construction, operations and maintenance directly and through public-private partnerships. Substantial public consultation/participation and accountability on road projects.

4+ Fully decentralised road administration. Commercialised road maintenance operations competitively awarded to private companies. Road user charges

reflect the full costs of road use and associated factors, such as congestion, accidents and pollution. Widespread private sector participation in all aspects of road provision. Full public consultation on new road projects.

Telecommunications

1 Little progress in commercialisation and regulation. Minimal private sector involvement and strong political interference in management decisions. Low tariffs, with extensive cross-subsidisation. Liberalisation not envisaged, even for mobile telephony and value-added services.

2 Modest progress in commercialisation. Corporatisation of dominant operator and some separation from public sector governance, but tariffs are still politically set.

3 Substantial progress in commercialisation and regulation. Telecommunications and postal services fully separated; cross-subsidies reduced. Considerable liberalisation in the mobile segment and in value-added services.

4 Complete commercialisation, including privatisation of the dominant operator; comprehensive regulatory and institutional reforms. Extensive liberalisation of entry.

4+ Effective regulation through an independent entity. Coherent regulatory and institutional framework to deal with tariffs, interconnection rules, licensing, concession fees and spectrum allocation. Consumer ombudsman function.

Water and waste water

1 Minimal degree of decentralisation; no commercialisation. Services operated as vertically integrated natural monopolies by government ministry or municipal departments. No financial autonomy and/or management capacity at municipal level. Low tariffs, low cash collection rates and high cross-subsidies.

2 Moderate degree of decentralisation; initial steps towards commercialisation. Services provided by municipally owned companies. Partial cost recovery through tariffs; initial steps to reduce cross-subsidies. General public guidelines exist regarding tariff-setting and service quality, but both under ministerial control. Some private sector participation through service or management contacts, or competition to provide ancillary services.

3 Fair degree of decentralisation and commercialisation. Water utilities operate with managerial and accounting independence from municipalities, using international accounting standards and management information systems. Operating costs recovered through tariffs, with a minimum level of cross-subsidies. More detailed rules drawn up in contract documents, specifying tariff review formulae and performance standards. Private sector participation through the full concession of a major service in at least one city.

4 Large degree of decentralisation and commercialisation. Water utilities managerially independent, with cash flows – net of municipal budget transfers – that ensure financial viability. No cross-subsidies. Semi-autonomous regulatory agency able to advise and enforce tariffs and service quality. Substantial private sector participation through build-operator-transfer concessions, management contacts or asset sales in several cities.

4+ Water utilities fully decentralised and commercialised. Fully autonomous regulator exists with complete authority to review and enforce tariff levels and quality standards. Widespread private sector participation via service/ management/lease contracts. High-powered incentives, full concessions and/or divestiture of water and waste-water services in major urban areas.

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SCIENTIFIC ASPECTS OF AGRICULTURE INNOVATIVE DEVELOPMENT IN MODERN RUSSIA

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Abstract

The aspects of agriculture innovative development are considered and the importance of the problem of effective agricultural development organization which is based on one's own innovation is shown in this article. On the system approach base, the authors reveal the essential functioning principles of creators, distributions and users of innovations in their interrelation in different conditions: creating and using their own innovations and using external innovations, especially foreign innovations. The proposals for modernizing institutional environment for the agricultural development which based on domestic innovations are made.

Keywords: *innovation, agriculture, institutional environment*

JEL Classification: *O3, Q16*

1   Introduction

In the economic theory most aspects of economy innovative development was discussed in detail. Josef Schumpeter in his fundamental research, "The Theory of Economic Development" (1912) for the first time touched upon new combinations and changes in the development of industries. He introduced the term "innovation" only in 1930 [1].

At the moment, the essence of innovation is well studied and it importance for economic development is revealed. Innovations have become a determining factor in the current stage of the world economy development. The importance

of the innovation primary implementation and consequences for other market participants at various delays in its implementation is well described.

Also it became clear that Schumpeter, when he considered creative destruction, meant the transition to innovations that change the technological mode. He showed that it is impossible to formation the new if the release from obstructive factors of the previous basis didn't happen. Often it happens through significant destruction of the previous action technologies. Although any innovation represents a new combination of the old with the creation of something new. A lot of improving innovations continue to develop the existing basis. And its implementation is not associated with a creative destruction. So, using of improving innovations for actors is much easier than to make the transition to the next new basis. It is necessary to change not only technology, to implement a new mode. It is often necessary to change the behavior of people in order to fully implement the basic innovation.

It is believed, that the origin of innovations is not so important as the ratio of benefits from their using compared to the costs of their creation or acquisition. We can see that companies in most industries producing goods and services not only carry out its own research and implement its results. They buy a lot of innovations with different rights of use them. The practice of buying innovative startups is expanding.

2   The situation in the Russian agriculture and research methods

Agricultural production is characterized by a very large number of businesses with different capacities, which are located in zones with different production conditions. Therefore, the methods of promoting and using innovations in these businesses differ from the methods of using innovations in industry. They differ even depending on the level of intellectual and material capacities of different representatives of agrarian businesses [2].

In innovation activity of small number of specialized companies, even if they are global level companies and have significant volumes of production, there are design-engineering units. They carry out the adjustment to the production conditions not only of their developments, but also of the external innovation. We can see different situation in agriculture, there in one region can operate tens and hundreds of businesses that don't have the capacity of technological adaption most innovations to their specific conditions.

Therefore, if the industrial firm can be considered as a socio-economic system, which is creating and acquiring innovations, then in the agricultural sector

individual farmers and even a small number of larger agrarian businesses cannot be considered as isolated systems of innovative development. Although large poultry farms and other similar agrarian businesses may have characteristic similar to industrial firms. It is clear that seed farms, other breeding and similar agricultural firms carry out their own scientific research and bring them to implementation as innovative products or innovative technologies, attract external innovation. In fact, farmers and other agribusinesses are only purchasers of these most important components of agricultural production. Therefore, in the matter of attracting and adapting innovations in agriculture, an important role is played by special extension service systems designed to carry out technological adjustment of innovations to the level of its practical implementation. Actually extension service should provide necessary technological instructions for concrete agricultural businesses. Today such instruction is provided by the producers of seeds, biological and chemical substances, and other components of agricultural production and technology.

In the developed world, the use of various know-how has been transformed into a well-organized and skillfully managed business a long time ago. We can say that such activity becoming the front line of competitive struggle. The agrarian business of Russia widely uses foreign innovations.

Thus, we find ourselves in a situation where our numerous agricultural businesses are beginning to enter into a single socio-economic innovative system, the core of which becomes foreign source of innovative development, foreign representatives that carry out adjustment and transfer of innovations. The cost of such an intellectual product increases from year to year. Therefore, the purchase of foreign innovative tools and subjects of labor actually means financing foreign science, foreign accelerated innovative development. Access to these sources can be blocked at any time. This situation puts our producers in completely dependent unfavorable conditions.

In this regard the importance of those who creates and implements innovations is very significant in Russia. It allows noticing all the weaknesses in time and take action to eliminate shortcomings. Domestic managers and experts delve into the smallest details of the creation and implementation of their own innovations. Also improving the skills of adaptation involved external innovation. It often happens in unexpected way that cannot be offered by foreign suppliers of innovative products. For example, Uglich poultry farm reassignment - a typical soviet enterprise – is interesting. Today it is a modern production of eggs and quail meat [3]. Every updated workshop of this factory is qualitatively different from the previous one - the identified shortcomings in previous workshops are taken into account during its reconstruction. Improvement at the Uglich poultry

farm goes in all areas of activity: technology, poultry breeding, management, marketing, organization, wage system and others. Such development is due to the systematic creation and involvement of not only technological innovations. The organizational and marketing innovations are also widely used. A production of innovation for the Russian economic conditions is going constant. Such enterprises represent a great value also because they ensure food security of the country [4].

Development of production when used its own or borrowed innovation is fundamentally different for several reasons. First of all, opportunities to self-improvement and duration of innovation cycle process are differ. Of course, organization of production based on its own innovations has a longer innovations life-cycle, greater costs for creating innovation. The payback of such innovations is longer. However, full ownership of the innovation allows us to timely carry out many of its improvements, to increase the life cycle of the modified innovation. In general, it allows benefit more from it than from a foreign "turnkey" innovation.

It can be said that in case of using its own innovation there is a constant circulation, like well-known formula Karl Marx "commodity - money - commodity". This circulation can be represented by an expanding spiral movement: carrying out of marketing and scientific substantiations – origin of innovation - its design - adaption - large-scale using - getting effect - numerous improvements of innovation based on company own experience - getting additional benefit. That is, we can say about constant expanded reproduction on an innovative basis, each turn of which brings its delta - an additional effect, materializing in added value. When companies use borrowed technology that is not the expanding spiral, it is a significant leapfrogging moving from one "walking in a circle" to another. The movement to a higher level of development, with increasing value and preserving shaky competitiveness. Even in the domestic business environment it will not be possible to get ahead: the same innovations are sold by foreign partners to all who are able to buy them. The most advanced innovations are not offered to us for many reasons, that it is no point in discussing.

When company use borrowed innovation, the economic cycle includes: innovation (I), purchased from outside; organization of production on its basis (P); the produced goods (G); money proceeds (M). Typically, each such cycle has linear character I-P-G-M. These cycles are repeated on different scales, bringing more or less constant revenue proportional to the scale of using innovation. In order to improve production, additional costs are required to purchasing improving innovations and its adjustment for production.

The development of production on the basis of company's own innovations can be interpreted in the form of expending spiral. Thus development is seen

almost without leaps with timely addition of new economic cycles on the basis of an improving or even basic innovation. Therefore, it is proposed to talk about innovative additions ΔI. Consequently, they lead to additions in production (ΔP) and to increasing output volume of goods or to improvement in its quality (ΔG) on this basis. This causes additional money proceeds (ΔM) in another chain:

$$I - P - G - M - \Delta I - \Delta P - G - \Delta G - M - \Delta M.$$

As a result of this turnover, revenue covers the costs of creating and implementation innovations and allows starting profit from the use of innovation faster than competitors. Often that level of higher profit is reached earlier than the market will be saturated. More frequently, the amount of profit is slightly higher than competitors' one, because there is no delay in innovation implementation. The higher profit level is a more significant source of financing for the creation of new innovations in all areas of the enterprise.

Thus, the considered variants of innovative development can be represented in the schemes shown in the Figure 1.

Figure 1 **Production development based on external (1) and own (2) innovations**

3 Results and Discussion

The development and systematic modernization of production on the basis of company's own innovations determines the creative nature of employees' work. There is an accumulation and deepening of the intellectual potential of developers and the whole team, which drawn into the orbit of technology improvement. The intellectual growth of such work communities ensures the development not only

of their enterprises. Also it ensures the stability of the state economy. Because, it is the inventions create the industrial revolutions that underlie economic growth.

However, let us return to the socio-economic innovation system. Today in the domestic crop production the role of foreign beet and corn seeds and some other plant species is very important. In animal husbandry it is foreign breeding eggs and breeding animals. The role of many foreign means of production is very significant also. It turns out that the spiral development described for a specific case of the quail farm is impossible in these systems. Development in such systems is only a leapfrogging movement, due to the purchasing and using of the one more foreign innovation. Moreover, even maintaining rotation in, so to speak, a closed circle at the same level is often link to the need for almost an annual acquisition of seeds from foreign seed farms. Such agrarian businesses are turning into primitive production and technological applications of the powerfully developing innovative foreign agricultural systems. In general, as stated above, domestic agribusinesses are becoming industrial applications to foreign innovation systems. These companies lose the ability to self-development, as its human capacity focused mainly on the adaption and using of external innovations. It negatively affects the development of Russian agrarian science and education. The longer-term adverse effects of this situation are becoming apparent.

Therefore, production development based on domestic innovations is very important for the food security and the accelerated development of competitive production. Russia has the necessary resources for this:

1. There a little less than half of world's black earth (chernozem) is located in the territory of our country.
2. More than a quarter of the 40 million hectares still unused land can be involved in production processes.
3. In many cases, low levels of pesticide usage in Russian fields have saved large land areas where it is possible to organize production of environmentally-friendly products. This technological gap now can be turned into a competitive advantage, because the low intensive use of agricultural land that was the reason of the little harvests, has significantly contributed to the preservation of Russian agriculture relic shades, which makes it possible to produce natural products on a biological basis.
4. There are large fresh water reserves (about 20% of the world's reserves) in the country, which can be used for land-reclamation purposes, for expanding the area of irrigated agriculture.
5. There are huge water areas, which allow a sharp increasing of commercial fish catching and expand its breeding in numerous and diverse water bodies.

6. The observed trends in climate change, which are associated with the increasing of air temperature and the increasing the amount of precipitation in our territory, open up new prospects for the development of agriculture in the Russian Federation.
7. There is a noticeable pool of Russian innovators who systematically generated and actively used innovations in their agricultural business.
8. An extensive network of agricultural scientific and educational institutions, which covers the main agricultural regions of the country.

The recent history shows the possibility of agriculture accelerated development in Russia, in the near future. Not long ago, our country was overwhelmed with a lot of foreign chicken products. Then it was the bulk of the meat in Russian stores. The situation has changed dramatically in a few years. Domestic production of these products has increased almost threefold over the past decade. The situation is similar in the development of the domestic pig farming (production growth over the decade was about 100%), which collapse was heralded, when Russia joined the WTO. Now the country is almost completely self-sufficient in meat, sugar, vegetable oil, vegetables. Even in the production of beef and milk progress is visible: in 2013 the country imported 40% beef and 30% of the milk, and in 2017 this figure fell to 25% and 10%, respectively. Also the growth of meat production (excluding poultry) was 24%, semi-finished meat products - 22%, poultry meat - 19%, butter - 9%. The production of greenhouse vegetables is growing. New gardens are laying and vineyards are establishing. In spite of a long payback period of these industries. It gives confidence that, in general, the goals for import substitution in agriculture will be achieved by 2020.

Active State support contributed to this. In 2017, State support amounted to 242 billion rubles, of which 35% was aimed at stimulating investment. Also should take into account the funds for the preferential purchase of agricultural machinery. In general, the investment part of the total State support is 42%.

At the same time, it became clear that the mechanisms of State support for agriculture is needed a significant modernization. It is necessary to change the vector of Agricultural policy in the direction of creating an enabling environment for innovative development. It is necessary to increase the role of domestic science. It is necessary to create the systems of a large-scale transfer of innovations among numerous agrarian businesses practically anew [5]. At present, not numerous domestic information and advisory service organizations in the Russian Federation regions almost do not engage in such activity. At best, most of them distribute only information about innovations to agrarians. It is necessary to significantly expand the scale of financing agricultural science using grants. At the

same time, it seems necessary to provide grants to scientists not only for scientific developments. It is necessary to provide second grant to them on the results of the successfully developed innovation. As well as providing grants for the primary implementation of innovations among the region agricultural businesses jointly with the agricultural information and advisory service organizations (extension service system). For that to happen, in each agrarian region should be: a fund for agricultural innovative development; agricultural advisory organizations that can carry out pilot demonstration activities. Also it should be understood that such advisory organization can become the integrator of regional agricultural innovation development system with numerous agrarian business, if it carry out the engineering design work as for domestic and for various foreign innovations. That is, it develops technological instructions for implementation innovations in typical conditions of different agrarian businesses.

4   Conclusion

It is necessary not only to allocate financial means of state support and identify the necessary measures in the program documents. It is necessary to prepare and adopt legislative and other normative legal acts to create an enabling institutional environment for innovative development of agriculture. Because we cannot do without a common understanding the essence of actors' new behavior in ensuring the innovative development of all agriculture branches. It will be very difficult to move on to new mechanisms of agriculture innovative development and to the corresponding behavior of existing actors without making a habit of new behavior under the influence of laws. The importance of this fact is noted by modern foreign and domestic institutional economy researchers [6,7].

It is necessary to develop and adopt the Law "About innovative agriculture development", which should clearly define the role of science and agricultural advisory service (extension service), the basis for the federal and regional agricultural development funds work with the active participation of agrarian business professional associations. The sources of federal and regional funding, the main financing mechanisms for science and for the primary innovation implementation by the agricultural advisory system on the basis of grants should be identified.

It is also necessary to envisage the development and implementation of advisory services standards in each regional agricultural advisory organization, primarily in the area of adapting innovations and transferring it to agrarian businesses.

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INNOVATIONS IN THE REGIONAL AGRO-INDUSTRIAL COMPLEX

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Abstract

The aim of the study is evaluating the modern level of the innovative activity determining bottle necks thwarting progressive and dynamic development of the regional innovative process, searching the ways of increasing economic efficiency of the innovative activityand developing methods of objective evaluation of innovations.

The following methods were used in the study process: monographic, analytical, systematic approach to studying economic phenomena, index analysis.

Conclusions: In order to activate the innovative process it is necessary to have the state financial support, more liberal regionalregulatory framework stimulating innovations increase, clever algorithm of innovative activity evaluation making possible to evaluate profitability of an innovative project.

Keywords: *innovations, investments, marketing innovations, profitability, technological innovations.*

JEL Classification: *O 31, Q13, R11*

1   Introduction

It is recognized at the state level that innovations are one of key directions for the successful development of the national economy. Moreover – in the priority order – innovations must concern the production industries which include the agrarian sector. Experience has proven that the introduction of innovations in this particular field of production activity is a very complex process. This is due to the specific nature of agricultural production, namely, the seasonality of the need for credit,

production etc. The introduction of scientific developments in the agro-industrial complex (AIC) involves a number of specific features which traditionally include the duration of the innovation development cycle in comparison with industry. Therefore it is impossible to obtain quick income here. And, as a rule, innovations are aimed at improving previous technologies as well as creating some new ones which do not produce an immediate effect and the lack of financial resources, the weakness of the market and competition hinder the development of innovations. The current stage of the regional economy development indicates that there are no large positive changes in the creation of an innovation system but there is an inertial development with low profitability of innovative projects and their low financial support by federal and regional budgets.

It has been proved by studies that in order to carry out the successful transfer of the agro-industrial complex to the innovation-based development, appropriate socio-economic conditions should be created, in particular, for the AIC to be a highly profitable sector, support of the innovation process at the state level is necessary and the domestic financial resources should play a decisive role in innovations financing. It is also necessary to carry out revolutionary technological transformations corresponding to the level of world standards [2]. Today the regional park of agricultural machinery is worn by 65…70 %, besides it is morally and physically obsolete. All this indicates that it is problematic to produce high-quality products meeting world standards on such a material basis [1]. The lag of the Russian Federation from the advanced countries in terms of the technical and technological potential of the agro-industrial complex is so great that it requires the adoption of government measures. Therefore the key direction of solving this strategically important problem is state support for investments and innovations as evidenced by the practice of many modern developed countries such as Germany, France andthe USA. Today Russia's policy in the field of agriculture contributes to attracting foreign capital and its flow is growing every year but the growth rate is not high. It is possible to attract foreign capital to the country or the region by creating an attractive innovative and investment climate and a deeply thought out tax and financial policy. All this must be taken into account when carrying out innovative activities. Each region in pursuance of the decisions of the Government of the Russian Federation strives to stimulate the introduction of innovations and to finance them both at the expense of regional and federal resources. In order for this process to be supported by a regulatory framework at the regional level laws and regulations promoting the development and support of innovative activity are developed respecting an important principle - regional legislation should not conflict with federal law.

2   Data and Methods

Ryazan oblast was one of the first in the Central Federal District to support the initiative of the Government of the Russian Federation in the field of innovation development and in November 2006 Ryazan Oblast Law No. 138-OZ "On Innovative Development and State Innovation Policy of the Ryazan Region" was adopted [3]. The creators of the aforementioned law saw the main goal of creating favorable conditions for innovation activity in the region and transferring the regional economy to an innovative way of development. In accordance with the goal one of the main tasks of this law was the creation – at the initial stage – of an innovation infrastructure that is the material base on which the region will rely in the process of developing and implementing a regional innovation policy. The region forms the regional target program for the development of innovation activities. It includes separate innovative projects and subprograms, comprehensive expertise and competitive selection of innovative projects are carried out. Examination is carried out on the subject of economic efficiency and payback period includes environmental and social justification, scientific and socio-economic significance. Organizations carrying out innovative activities have certain privileges within the framework of local taxation such are the benefits established by regional legislation for priority or major investment projects of an innovative orientation. So the Law of Ryazan Oblast No. 33-OZ "On State Support of Investment Activity on the Territory of Ryazan Oblast", dated April 6, 2009, provides the reduction of the corporate profit tax rate in the part credited to the regional budget. Specific amounts of benefits are set by the Law of Ryazan Oblast "On Tax Benefits" dated April 29, 1998. The property tax for basic projects is reduced from 2.2 % to 1.1 % and the profit tax goes down from 20 % to 18 %. The property tax for priority projects can be reduced from 2.2 % to 0.6 % and the profit tax goes down from 20 % to 16 %. Among the list of paramount measures to improve the system of updating the material and technical base of the agricultural sector there are preferential taxation conditions for transaction participants. We consider that it is long overdue to exempt the innovation process participants from paying 18 % value added tax for the period of mastering innovations. The final goal of innovations is the growth of economic efficiency of production, in particular, for the agro-industrial complex these are the rational land use, current and fixed assets, labor resources and saving material and monetary costs.

3   Results and Discussion

The practical regional experience in introducing innovations into the production activities of enterprises of the agro-industrial complex shows that this process is of limited nature. So the share of organizations engaged in innovation activity is low in the region and the growth rates are extremely low in time so one can confidently say that when such a modest growth dynamics, the process of mastering innovations will take a long time. (Table 1)

Table 1 **Innovative activity of the region for 2012-2016**

Parameters	2012	2013	2014	2015	2016	Changes for the period, %
Ratio of organizations having innovative activity,%	11.0	11.4	13.1	13.8	14.1	128.1
Ratio of organizations having technological innovations,%	9.8	10.5	11.3	11.6	12.1	123.4
Ratio of organizations having organizational innovations, %	3.4	4.6	3.0	3.1	3.2	94
Ratio of organizations having marketing innovations, %	3.1	3.1	1.8	2.1	2.0	64.5

A key role in the structure of regional innovations is played by technological innovations which represent the final result of the innovative activity in the form of a new or improved product or service introduced at the market. There is a positive trend in this direction but there is no growth in organizational and marketing innovations.

The study identified some factors limiting the innovative activity in the region which can be reduced to the following main ones, namely, the lack of own financial resources of organizations – 60 %, the lack of financial support of the state – 42 %, the high cost of innovations – 56 %, high economic risk – 43 % and low demand for new goods (work, services) – 27 %. These data indicate that the main problem is the lack of sources of financing for innovations.

Innovation activity is connected with capital outlays. Therefore the region had certain expenses in these important directions throughout the whole study period. Table 2 presents the innovative activity expenditures of the region.

Table 2 **Dynamics of innovations expenditures in economic activities of the region, mln. rubles**

Parameters	2012	2013	2014	2015	2016	Changes for the period, %
Total expenditures	6557.9	7251.3	7567.8	7896.5	8124.9	123.8
Those for technological innovations	6247.2	7242.3	7321.7	7754.8	7912.1	126.6
Among them: products	5731.4	6439.1	6865.3	7214.4	7134.7	124.4
processes	515.8	804.2	456.4	540.4	777.4	150.8
Marketing innovations	151.4	1.7	198.1	102.1	174.1	115.2
Organizational innovations	159.3	7.5	48.0	39.6	38.7	24.3

This expenditures structure (Table 2) is positive because more than 90 % of them go for technological innovations which indicate that the region is focused primarily on innovations in the production sector which in modern conditions of its economic development is very important. In the regional structure of innovation expenditures the organization own resources are the largest share (64-73 %), federal budget resources are 7-13 %, budgets of RF subjects comprise 3 % and others are the rest. Such a structure does not allow developing innovative processes purposefully and rapidly as it is focused on own sources which are not enough in the agro-industrial complex. So this structure does not stimulate the innovation process. For a sustained and dynamic growth of innovation activity we believe that federal budget spending should be at least 50 % in the regional structure of innovation expenditures.

The innovation process is a purposeful and continuous process of searching, preparing and implementing innovations that improve production efficiency. Moreover the key areas of innovations today should be considered the modernization of all strategic industries in the region and, first of all, industry and agribusiness i.e. the creation of a modern material and technical base on an innovative component. That means the known procedure for introducing innovations is related to the implementation of current and capital expenditures which in the course of their implementation should bring revenue or profit thus raising the problem of assessing the efficiency of the innovation process.The innovation process is a cost-based process. Its goal is obtaining some economic effect a very significant one. Today scientific literature presents attempts to evaluate the economic efficiency of innovations concerning a certain range of parameters. There are diverse views and various methods to evaluate the innovations efficiency in the modern theory and practice but they are all unanimous that the economic

effect of the innovation process should be evaluated taking into account the costs and revenues during its realization. We suppose that it is quite realistic to evaluate the effect of innovations based on the principles of evaluating the effectiveness of investment activities as the funds spent on the innovation process are nothing more than capital costs. But taking into account this hypothesis it is necessary to consider the temporary assessment of the effect which is connected with inflation processes in any market economy and Russian, in particular, where inflation is much higher than in most developed countries of Europe having a relatively stable economy and very modest inflationary expectations. Thereforeit is necessary to consider the inflation factor when evaluating the efficiency of innovation costs for the national economy because only taking into account all these features will enable us to give objective value of the economic effectas a result of innovations introduction and development. In order to solve the task – from our point of view – the effectiveness of the innovative project can be estimated using the following formula (1):

$$I_{eff} = R(P)/(Ex_i + (Ex_{i*}C_i)) \qquad (1)$$

where, $R(P)$ – innovation revenue (profit)

I_{eff} – innovation process efficiency

Ex_i – innovation process expenditures

C_i – coefficient of expenditures adjustment with inflationary expectations.

For the purpose of reliability in calculating the effect of introducing innovations the C_i parameter should be oriented towards the time value of long-term loans provided by the system-forming banks of the country. These interest rates for investment loans should form the basis for an objective evaluation of innovation activity as they are the closest ones to evaluating the current state of affairs at the credit market and more objectively assess its inflationary expectations. There is an opinion that the key refinancing rate of the Central Bank of the Russian Federation can also be taken into account in such calculations and can serve as a guideline for the correction coefficient for inflation but we believe that this parameter is less correct and does not reflect the real level of inflation in the country as the Central Bank usually evens this rate which means it does not allow reliable correction of capital expenditures for innovations in the previous time period and bring them in line with the current level of value.If you are based on rates for long-term loans in calculations then it becomes very important to monitor the price of long-term credit resources provided by large banks to their borrowers as loan rates are constantly changing over time so this coefficient should be constantly adjusted taking into account its dynamics. There is a direct proportion. The

reduction of the Central Bank of Russia key interest rate causes some decrease of the interest rate on commercial banks' credit resources. In modern conditions – from the middle of 2017 and early 2018 – interest rates on long-term loans have had a steady downtrend which indicates some certain reduction of inflationary expectations which were very high after the economic sanctions of the EU and US countries. Let's consider the offered algorithm of calculation and evaluation of innovations efficiency taking into account the time period by the example of an innovative project. We assume that the period of developing and implementing the innovative project is three years as a basis (Table 3).

We will evaluate the efficiency taking into account periods of the year, namely, the quarters - 1, 2, 3 and 4. The calculation technique allows determining the effectiveness of introducing innovations in each specific time interval. Investments for quarter 1 of 2015 are shown at the level of actual expenditures because it is the starting moment of the innovation process. Further investments are subject to adjustment for the time factor according to the above formula. It should be noted that the shorter the time period for expenditures adjustment the more reliable the results obtained. Taking into account the performed calculations it can be noted that the effect of innovation is reduced in all time periods if the time value of investments in innovations is corrected. This algorithm gives – from our point of view – more objective evaluation of the innovation effect and gives more correct economic evaluation of the innovation process efficiency. On the scale of significant innovations investment even small deviations and errors in evaluating the innovation process efficiency result is very considerable financial resources. So according to the proposed algorithm the cumulative capital expenditures brought to the level of the current time amount to 6084.8 million rubles and the capital expenditures for innovations without adjustment for the time period are 5408.9 million rubles thus the difference in the estimate is 675.9 million rubles (6084.8 million rubles - 5408.9 million rubles). This is the restored cost associated with the level of inflation for a three-year period of development of an innovative project that makes objective evaluation of the economic effect of innovation possible. It is also necessary to make some comments on the application of the proposed methodology. In the context of lower inflationary expectations the calculation by this algorithm may be more reliable but, unfortunately, the Russian economy still has very high inflationary expectations contrary to the statements of official authorities about its significant suppression. Even the officially announced inflation rate and the declared refinancing rate of the Central Bank of Russia equal to 8 % are extremely underestimated and do not reflect the real inflation in Russia as evidenced by a more than 2-times rise in prices for goods works and services since 2014.The rates for short- and long-term loans provided to their borrowers

by commercial banks which are much higher than the officially announced refinancing rate of the Central Bank of Russia can also serve as an indicator of the inflation rate.However objectively evaluating the situation it should be pointed out that the inflation rate in the country in 2017 slowed somewhat but this positive process should be approached with a certain degree of caution.The trend towards lowering interest rates for long-term loans at a faster pace than that of lowering interest rates for short-term loans can be viewed as an indication of the state economy stabilization.

Table 3 **Benchmark assessment of economic efficiency of the innovative project adjusted for time lag**

Parameter	2015					For 3 years
	1 quarter	2 quarter	3 quarter	4 quarter	Whole year	
Total expenditures for innovations, mln.rub., including:	561.6	555.4	678.2	609.9	2405.1	7689.9
capital (Ei)	488.0	432.0	543.4	478.2	1941.6	5408.9
current	73.6	123.4	134.8	131.7	463.5	1831.0
Revenues from innovative process for implementation period, mln.rub. (R)	84.2	77.8	56.9	76.8	295.7	1298.9
Average year interest rate on investment loans provided by commercial banks to production enterprises in the country (region), % (Ci)	17.0	17.0	16.5	15.5	16.5	14.1
Progressive total investment provided by current time, mln. rub.	508.7	450.3	565.6	496.3	2020.9	6084.8
Innovative process efficiency with adjustment for time period (Ieffadj.), %	16.5	17.2	9.9	15.4	14.6	21.3
Innovative process efficiency without adjustment for time period (Ieff), %	17.2	18.0	10.3	16.0	15.2	24.0
Adjusting deviation, %.	-0.7	-0.8	-0.4	-0.6	-0.6	-2.7

Parameter	2016					For 3 years
	1 quarter	2 quarter	3 quarter	4 quarter	Whole year	
Total expenditures for innovations, mln.rub., including:	621.1	513.8	577.4	617.7	2309.3	7689.9
capital (Ei)	453.2	356.9	432.1	438.9	1660.4	5408.9
current	167.9	156.9	145.3	178.8	648.9	1831.0
Revenues from innovative process for implementation period, mln.rub. (R)	123.7	134.5	116.4	114.9	489.5	1298.9
Average year interest rate on investment loans provided by commercial banks to production enterprises in the country (region), % (Ci)	14.5	14.0	13.5	13.0	13.7	14.1
Progressive total investment provided by current time, mln. rub.	469.6	369.3	446.6	453.1	1738.6	6084.8
Innovative process efficiency with adjustment for time period (Ieffadj.), %	26.3	36.4	26.0	25.3	28.1	21.3
Innovative process efficiency without adjustment for time period (Ieff), %	27.0	37.6	26.9	26.1	29.4	24.0
Adjusting deviation, %.	-0.7	-1.2	-0.9	-0.8	-1.3	-2.7

Parameter	2017					For 3 years
	1 quarter	2 quarter	3 quarter	4 quarter	Whole year	
Total expenditures for innovations, mln.rub., including:	869.7	755.8	743.2	731.2	2975.5	7689.9
capital (Ei)	578.1	567.9	567.8	543.1	2256.9	5408.9
current	167.2	187.9	175.4	188.1	718.6	1831.0

Parameter	2017					For 3 years
	1 quarter	2 quarter	3 quarter	4 quarter	Whole year	
Revenues from innovative process for implementation period, mln.rub. (R)	124.4	121.6	132.6	135.1	513.7	1298.9
Average year interest rate on investment loans provided by commercial banks to production enterprises in the country (region), % (Ci)	13.0	12.5	12.0	11.0	12.1	14.1
Progressive total investment provided by current time, mln. rub.	596.9	585.6	584.8	558.0	2325.3	6084.8
Innovative process efficiency with adjustment for time period (Ieffadj.), %	20.8	20.7	22.6	24.2	22.0	21.3
Innovative process efficiency without adjustment for time period (Ieff), %	21.5	21.4	23.3	24.8	22.7	24.0
Adjusting deviation, %.	-0.7	-0.7	-0.7	-0.6	-0.7	-2.7

4 Conclusion

Understanding at all levels of government and management that the priority is to attract domestic and (or) foreign capital to innovations and investment activities and not just long-term lending for these areas is an element of sustainable development of the country's economy. Of course the way out of the crisis situation and the stability of its economy is also reducing dependence on the export of raw materials and developing its own production of the main types of marketable products.

The presented evaluation of the cost of the innovative projects effect gives – in our opinion – a fairly objective picture of the innovations profitability which the investor must ultimately take into account by investing in an important strategic project and make the most correct decisions in a case of some alternative variants for their implementation. Here it is necessary to conduct their comparative alternative analysis using the recommended calculation algorithm. It is possible to apply this evaluation algorithm successfully at the regional level, developing

and implementing innovative projects in the agro-industrial complex, developing current, prospective financial plans in which innovation funds are provided.

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AGRICULTURAL INNOVATION, ADVISORY SERVICES AND NEEDS ASSESSMENT OF THE AGRICULTURAL INNOVATION TRAINING IN THE SLOVAK REPUBLIC

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Abstract

A variety of successful innovations have been introduced in Central European during recent decades. Investments in R&D and agricultural innovations have been fundamental to long-term economic growth worldwide. Recently, substantial shifts in the scientific basis have created a new and promising set of opportunities for innovation in agricultural. Every innovation is a new combination of resources, particularly ideas, skills, information, different types of capabilities, inter-organizational learning and knowledge, and specialized assets. Organizational innovations are as important as product or process innovations. The main actors in AIS in the Slovak Republic are Ministry of Agriculture and Rural Development, Slovak Commerce and Agricultural Chamber, Suppliers and food processors. Investments in R&D and agricultural innovations have been fundamental to long-term economic growth worldwide. However, R & D activities remain weakly supported by the public and private funding in Slovakia. As the result, productivity of the Slovak innovators remains low as well. However, in Slovakia there does not exist any special agency for innovation in agriculture. The tasks of innovation are separated into an agencies and institutions dealing with research and spreading knowledges in agriculture sector. The need for innovation system must become more important in the Slovak Republic in order to facilitate farmer's access to information and knowledges to achieve sustainable

and competitive productivity growth. There are many institutions in Slovakia that have path for innovation in agriculture. But there is a huge absence of advice and innovation for food industry. In the agriculture, cooperation between several different types of actors is seen as key to successful innovation. There is no specific national agreement about integration of knowledge exchange among AIS actors. The whole innovative process is provided by the foreign companies, especially in technological area. The process of innovation in Slovak agriculture is mainly based on workshops, scientific conferences and trainings, which is not enough. The need of change a policy in innovation and advice system is very much required.

1   Introduction

Agricultural innovation system (AIS) should enables to all engaged people in agriculture field to adapt rapidly when changes occurs and it should help them to respond well prepared when opportunities arise. Agricultural innovation system indicates a system that links people and institutions to promote mutual learning and generate, share, and utilize agriculture related technology, knowledge and information. The system integrates farmers, agricultural educators, researchers, and advisors to harness knowledge and information from various sources for improved livelihoods. The World Bank (2012) state that the agricultural innovation system approach has evolved from a concept into an entire subdiscipline, with principles of analysis and action; yet no detailed blueprint exists for making agricultural innovation happen at a given time, in given place, for a given result. Speaking about investments in R&D and agricultural innovations have been fundamental to long-term economic growth worldwide. However, R & D activities remain weakly supported by the public and private funding in Slovakia. As the result, productivity of the Slovak innovators remains low as well. However, in Slovakia there does not exist any special agency for innovation in agriculture. The tasks of innovation are separated into an agencies and institutions dealing with research and spreading knowledges in agriculture sector. In Slovakia, there is not establish institution focused on agricultural innovation system. AIS is connected with AKIS and it facilitates farmers to access to information and knowledges to achieve sustainable and competitive productivity growth. In Slovakia. Establishment of the integrated national innovation system should be a key priority for the Slovak government.

2   Data a methodology

The objective of this study is to have a general overview of the agricultural innovation system in Slovakia. In order to achieve the set goals, all data were acquired by a mixed methodology of a semi-structured interview and questionnaire. The framework of this article developed a questionnaire, which was tailored to direct beneficiaries of projects. The sources for research were obtained from primary data. Through the questionnaire survey, we obtained information and data about the need of advisory service and innovation system in Slovakia. Data were gathered through face-to-face interviews. The survey was administered in 2017 and included 20 direct beneficiaries' different regions of Slovakia. The data were classified on the basis of common characteristics: descriptive and numerical.

We decided to use as well methodology of semi-structured interview because of the fact that interviewer is able to follow topical trajectories in the conversation, so it is possible to obtain more data from respondent contrary of the normal questionnaire survey.

The semi-structured interview was preceded by informal observation and unstructured interviewing with the respondent, in order to develop a keen understanding of the topic of interest necessary for developing relevant and meaningful semi-structured questions. In the interview, was used open-ended questions as well as yes-no questions. The inclusion of open-ended questions provides the opportunity for identifying new ways of seeing and understanding the topic at hand. On the other hand, yes- no questions are easier and more quickly to answer and improves consistency of responses. Overall, by using yes-no questions there are fewer irrelevant or confused answers to sensitive questions.

3   Results and discussion

3.1   Innovation and trainings in the Slovak Republic

In accordance with implementation of Cross Compliance in agri-food sector the agricultural innovation and extension services are becoming more important. Alongside of the entirely agricultural services in the FAS in Slovak Republic are involved such activities as renewable energy sources, organic farming, sustainable development of agriculture, forestry and regional development.

The advisory services are in the field of agriculture coordinated by Agroinstitut Nitra and in the field of forestry by IFEE. This task is delegated to the both institutions by MOARD.. The main tasks for coordinating bodies are knowledge sharing, accreditation of advisors and certification of advisory organizations. The

education system related to advisory services compresses mandatory education connected to the elaborated project oriented towards selected field which represents the organic part of the accreditation process and then supplementary education programme of a periodic nature. The second part of the accreditation process is composed of general and technical elements. The education model continues with a course founded on personal communication. The outputs of the advisor's work are evaluated on a reference basis related to quality of provided services, number of prepared and implemented EU projects, and according to other criteria. In total, 27 educational models for advisors have been accredited by the Ministry of Education, Science and Sport. Among the accredited programs, there are for example following models: thematic focus: Environment, Public Health, Crop and Animal Health, Economics, Management and Marketing, Livestock Production and Crop Production etc. In Slovakia after 2007 the accreditation of extension services became more demanding process. In total 131 advisors are registered and 102 advisory agencies are certified which are having first of all the commercial nature. The controlling process of the operation of FAS is ensured by three forms. The first one is connected to evaluation of the annual Green Report's activities of coordinating bodies and collaborating institution. The second level is via Agricultural Paying Agency (APA), through the control of the use of allocated resources for FAS. The third level is monitoring and evaluation of advisory activities by farmers and other beneficiaries of extension services. The evaluation is assessed by coordinating bodies. The quality of the whole system is evaluated according of International quality standard ISO 9001:2015.

3.2   Innovation capacity

Every innovation is a new combination of resources, particularly ideas, skills, information, different types of capabilities, interorganizational learning and knowledge, and specialized assets. According to the World Bank (2012) is innovation the process by which individuals or organizations master and implement the design and production of goods and services that are new to them irrespective of whether they are new to their competitors, their country, or the world. Organizational innovations are as important as product or process innovations.

In meeting of the farmers'/clients' requirements are playing meaningful tasks all research institutions and agricultural institution agencies. Each of them is receiving the required services, process them and provide with advices, formulate the projects/ programmes, prepare the strategies/concepts etc. Public institutions are responsible for their respective field, however there could be potentially and practically overlaps among research institutes and public organizations on one hand and academic institutions on the other hand, since they are managed from

two different Ministries. In addition to this, it is noted the significant upward trend of the services provided by commercial organizations focused on such activities as inputs of seeds, agrochemicals, new technologies, machineries and equipment's, feeds, animal genetic resources, or land reclamation and irrigation.

The coordinating bodies for dissemination of information and announcements are Agroinstitut Nitra and IFEE for their fields. For this purpose is operated internet portal www.agroporadenstvo.sk. The basic task of Agro portal is organization, processing and distribution of information for the use of agricultural extension and food production. The technical operations and information security are carried out by operator.

The database is providing following information:
- Information about legislation of agricultural extension – focused on the methodological aid to the advisors and clients of agricultural extension services,
- EU legislative information,
- List if accredited organizations/certified advisors,
- Database of the advisory activities of organizations operating in sector about their extension activities and target groups,
- Professional information which are serving to the advisors and beneficiaries of the advisory services, the news from the science and research, new technological procedures, crop cultivation and animal raring trends,
- Information in the form of articles and publications grouped into individual categories: crop production, animal production, machinery and equipment's, economics, food processing etc.,
- Simple databases systems (machineries, agrochemicals, feeds, medicines etc. with opportunities to obtain the full wording.
- Weather forecast,
- Important role is played by Advisory forum which is the dialog among the users of system on the one side and on the other side with representatives of sector's research institutions, organized during the exhibitions, conferences, field days etc.

Furthermore, important role is paid by Info-terminals in frame of Central Agricultural Advisory System. The mission of the Central Agricultural Extension System is to ensure a qualified and high standard of agricultural extension in Slovakia. Info terminals are working places equipped with computers, which are situated in all regions and some districts of the country. They are accessible to potential users. The info terminals are also furnished with so-called info desks,

equipped with printed materials (leaflets, guidebooks, legislation, information sheets, etc.).

3.3   The role of innovation brokers in knowledge economy

Oettinger, J. - Henton, D. (2013) define brokers as a people working to bring ideas and people together. The value they create is often so intangible as to go unnoticed. They are the ones who seek out connections between people and ideas and foster conversation and interaction. If you see cross-discipline and inter-team work that is producing new ideas and thinking, there is someone playing the role of broker, someone who saw a connection between this and that and took steps to bring people together. The greatest threat to innovation is an information silo. Free and open information exchange and conversation is the fuel that drives innovation in organizations; but all too often, information is walled off in divisions, functional areas, or geographies. Brokers are often somewhat rogue or indifferent to convention and hierarchy. Every innovation takes a risk. It brings good judgment and self-awareness to everything, but understands that there is a point beyond the safe – where there are disproportionate rewards. In any organization, there are plenty of fumbles, missteps and failures.

The role of agro-innovation broker means undertaking following task:
- Good understanding of farming to be able to identify with the client group.
- Supports entrepreneurs to foster a network of open idea flow, capital and services aimed at helping companies innovate
- Being able to persuade farmers to do something to improve their farm business and to take a risk.

3.4   Competence matrix of an Agro-innovation broker

Innovation brokers are valuable because they operate from independent and neutral "third party" position and due to this fact they have to have some special skills. The survey shows that the most important broker skills according to Slovak farmers opinion are the ability to offer proper advice (20 responses), cooperate, network with key farmers, innovators (19 responses) and to write reports and projects. The most important agricultural knowledges are crop production (seeds, pests) (19 responses), writing, managing, implementing projects (19 responses), food quality (18 responses) and economic benefits (20 responses). All the data we can see in Figure 1 and Figure 2, which point to the interpersonal broker skill and agricultural knowledges.

Figure 1 **Interpersonal Broker skills**

Source: Own work based on the questionnaire survey.

Figure 2 **Agricultural knowledge**

Source: Own work based on the questionnaire survey.

Required competences and knowledge of agro-broker according realized research are:

- Understanding of farm management, able to understand in crop and animal production and food safety issues.
- Able to operate in an industry setting, stimulating environment where innovation is a cultural norm, be able to negotiate, communicate and spread the knowledges.
- To have knowledge about factors effecting domestic and international markets, to have information about market prices development.
- Knowledge about project management and be able to react on national and international calls.
- Education in agricultural or agricultural economics.
- Work experience in agricultural advisory system.
- Interpersonal Broker skills are:

- Offer proper advice, be able to listen a real problem and understand a real need.
- Investigate problems, offer proper advice.
- Write reports, projects – for grant purposes.
- Willingness to cooperate in team, negotiate and merge people.

3.5 Needs assessment of the agricultural innovation training in the Slovak Republic

"Innovation is a powerful engine, fuelled by brokers, role models and risk-takers."

Warren Zevon

The term "Innovation" is according to Tamáš -Kopta- Zdráhal (2017) very broad, can therefore be combined with: a new and improved products, techniques or technologies, processes or even their adjustment to new, e.g. environmental requirements. Novelty is considered as an innovation only when it becomes commonly applied in a given field and when it brings substantive effects.

In a knowledge society the innovation system supports its businesses and entrepreneurs by fostering a network of open idea flow, capital and services aimed at helping companies innovate and get ideas off the ground.

What is the role and why are innovative brokers in agriculture important in Slovakia?

Brokers are working to bring ideas and people together. The value they create is often so intangible as to go unnoticed. They are the ones who seek out connections between people and ideas and foster conversation and interaction. If you see cross-discipline and inter-team work that is producing new ideas and thinking, there is someone playing the role of broker, someone who saw a connection between this and that and took steps to bring people together. The greatest threat to innovation is an information silo. Free and open information exchange and conversation is the fuel that drives innovation in organizations; but all too often, information is walled off in divisions, functional areas, or geographies. Brokers are often somewhat rogue or indifferent to convention and hierarchy. Every innovation takes a risk. It brings good judgment and self-awareness to everything, but understands that there is a point beyond the safe – where there are disproportionate rewards. In any organization, there are plenty of fumbles, missteps and failures.

In the Figure 3 we can see current situation of agricultural innovation training in the Slovak Republic, which has its own strength and weakness as well. The matrix is divided into three categories – Innovation and training, Innovation capacity and Innovation partnerships.

Figure 3 **Agricultural innovation training situation in the Slovak Republic**

	Innovation and training	Innovation capacity	Innovation and partnerships
Strength	- The advisory services on the regional, i.e. direct level - Special training courses, conferences, seminars, projects. - Struggling to improve the position of farmers in society - Negotiation struggling to improve the position of the food industry. - Negotiation with business chains- store declares interest in Slovak products.	- Farmers have enough possibilities to cooperate as well various fund options, from several programs offered by EU.	- Activities are realized by activities in the whole territory in whole Slovakia.
Weakness	- Insufficient networking between the research and practices. More activity in the intensive use of innovation. - Limited training opportunities on appropriable level	- Belief that the agricultural innovation system in Slovakia exist, but not in organized and state-aided form. - Intensify the information dissemination targeting at agricultural innovations and as well as the latest knowledge of since and research. - Encourage farmers to more intensive use of innovations. - On the one hand farmers have the capacity and potential to adopt innovation but on the other hand there are not that active in searching information about possibilities of active support from EU.	- Networks and collaboration are difficult to establish, but it is very important to do it. - Necessary to generate research tasks directly based on the demand of farmers. - Transfer results of research directly into practice. - The cooperation is not extended in the agricultural area.

Source: Own work based on the questionnaire survey.

4 Conclusion

Agricultural innovation system indicates a system that links people and institutions to promote mutual learning and generate, share, and utilize agriculture related technology, knowledge and information. The system integrates farmers, agricultural educators, researchers, and advisors to harness knowledge and information from various sources for improved livelihoods.

As it is visible from research below, in Slovakia many institutions have path for innovation in agriculture. But there is a huge absence of advice and innovation for food industry. The whole innovative process is provided by the foreign companies, especially in technological area. The process of innovation in Slovak agriculture is mainly based on workshops, scientific conferences and trainings, which is not enough. The need of change a policy in innovation and advice system is very much required.

One of these changes could be "innovations broker", who will bring ideas and people in agriculture together. In general innovation broker should offer a fresh look at diagnosing the constraints and opportunities of farmers or, at a higher level, production chains, regions, or sub-sectors. Due to their critical approach, brokers tent to force their clients to look for possibilities beyond their current situation and constraints. The question is if the Innovation Brokers are the answer how to change current situation in the agriculture? We agree with Klerkx et al. 2009, who said that in many countries network building and facilitation for agricultural innovation is seen as principal challenge and thus innovation brokers may be a valuable new type of actor in the agricultural knowledge infrastructure and the agricultural innovation system. Innovation brokers are valuable because they operate from independent and neutral "third party" position as regards the problems and challenges they address, the partners to involved and their interest during the innovation process.

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INNOVATIONS IN AGRICULTURE IN POLAND - THE ROLE OF INNOVATION BROKER IN THE OPINIONS OF FARMERS

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Abstract

The main aim of the investigations was an assessment of the state of knowledge and learning farmers' opinions about agricultural knowledge and information system in Poland. Farmers' perception of the presence of innovation brokers in the agricultural advisory system and their expectations towards brokers were studied. The main research tool was survey questionnaire, which included several dozen of respondents. Obtained research results corroborated the Authors' surmises that present system of agricultural advisory in Poland does not bring satisfactory results for farmers, particularly concerning the implementation of innovative solutions on farms. Farmers rightly identified increase in innovativeness as one of the main needs on the way to development of Polish agriculture. Moreover, they positively assessed including so called innovation brokers in the agricultural knowledge and information system. They indicated their key role in dissemination and upgrading knowledge and skills of farmers in relation to the application of innovative solutions in the process of production and farm management.

Keywords: *consulting, innovation broker, innovations in agriculture*

JEL Classification: *O31, O39, Q19*

1   Introduction

The aim of currently functioning agricultural knowledge systems is supporting public activities for the development of innovativeness in agriculture. Agricultural knowledge systems developed in this way form specific relations networks among organizations, enterprises and persons (in the first place farmers) focused

on economic use of new products, techniques and technologies and new organizational forms together with public institutions and state or formation policy (e.g. the European Union) (Kania, Drygas, Kutkowska & Kalinowski, 2011). The subjects forming the relations network influence the way in which its individual members affect building the knowledge resources in the agricultural sector. Using the accumulated knowledge for their own needs and sharing it with other interested parties, they become the creator of agricultural knowledge and information system in a way determining its scope, functioning and the level of provided services.

1.1 Agricultural knowledge and information system in Poland

The agricultural knowledge and information systems in most European Union member states are dominated by the public sector. In case of Poland, the state higher education institutions and research institutes with their experimental stations were assigned the key importance for creating and development of knowledge in this system. The ideas which arise in these units are then transferred to public units of advisory services to be finally passed to their final recipients, i.e. farmers maintaining direct contacts with agricultural advisors (Figure 1). In Polish agricultural knowledge and information system the strongest cooperative relations occur only between farmers and advisors from the Agricultural Advisory Centres (Kiełbasa, 2016). The links between the other participants of the system, e.g. between a university and farmers or research institute and agricultural enterprise may be considered slight or even indicated as non-existent. Therefore, agricultural advisory system as the element closest to a potential purchaser of innovations, has been ascribed the key informative and applicational role in the agricultural knowledge and information system (Kania, 2014).

Figure 1 **Elements of agricultural knowledge and information system in Poland**

Considering the fact that agricultural advisory plays a key role in the information flow within the national system of agricultural knowledge, it becomes a kind of intermediary between the sphere of research (i.e. representatives of research and science) and agricultural producers, who are potential recipients of suggested innovative solutions serving farm development. Therefore, agricultural advisory centres start cooperation with various scientific units. They direct knowledge obtained in this way straight to farmers, who translate it into practical sphere and implement innovative solutions concerning, among others, organization of farm production, efficiency of applied production technologies, development of farms and their management (Piecuch & Płonka, 2017).

However, it is worth to mention that in the face of the dominant role of agricultural advisory in the agricultural knowledge and information system, the importance of the other elements of the system cannot be disregarded. Representatives of the scientific community have the responsibility to update the current knowledge and seek new and original solutions, targeting directly farmers and units from the environment of agriculture. Therefore, owing to the sphere of science, extending and upgrading knowledge in a widely understood area of agriculture is possible. The rank of importance in the agricultural knowledge and information system should be also emphasized with reference to farmers themselves. It should be remembered that very often the source of innovation in agriculture are problems emerging during the process of production, which may remain unnoticed or be omitted while developing new solutions and which a farm or processor is unable to solve using the knowledge or technology they possess at the time. Therefore, a need for mutual information flow arises between science-farmer-science and introducing some changes based on it, either in production technology and work organization, or for the improvement of marketing and sales (Piecuch & Płonka 2017). Keeping in mind the existing and constantly emerging new problems, there is an obvious need for transferring modern and already known organizational or technological solutions to practical applications on a large number of farms.

1.2   Innovations in agriculture

The concept of innovation is one of the most complex and ambiguously defined terms in the theory of economics. The term innovations is widely understood and refers to all spheres of life, starting from new solutions in the area of economic or social life and ending with new currents of thought and culture (Janasz & Kozioł, 2007). The literature of the subject offers a wide variety of approaches defining the term of innovations. According to Shumpeter (1960), innovations are solutions concerning creation of a new product or marketing the goods with new

properties, introducing a new method of production, opening new sales market or conducting re-organization of economic processes. Kotler (1994) argued similarly, referring innovations to goods, service, methods or idea perceived by someone as new, and Rogers (1983), who thought that innovation is an idea perceived by a unit as new. According to Fagerberg (2005) innovations are new and better solutions than applied by people before, which influence socio-economic living conditions. Freeman (1982) presented a slightly different opinion on that matter. Basing on the Mansfield's (1968) definition treating innovation as the first application of an invention, narrowed its meaning to the first commercial application of a new product, process or device. According to Koch (2004), innovation is a change bringing profit. On the other hand, Silverberg (1994) stated that innovations are the result of the impact of internal factors, such as expenditure allocated by the domestic economic entities on R+D activities or investments in education of human capital (Górka, 2015).

The term of innovation applied to agriculture also reveals a variety of interpretations. Considering the definition by Maziarz (1977), agricultural innovations are new creations, production measures or ideas, which serve to raise the social prestige and stimulate teamwork. According to Michałowski and Wiśniewski (2008) innovations in agriculture are the changes purposefully introduced by farmers, replacing former methods of production or products by new, more effective and useful in given conditions. On the other hand, Kałuża and Ginter (2014) add, that agricultural innovations are not only production technologies, allowing for a more rational utilisation of the farm resources and lower consumption of agronomic inputs, but also activities connected with the dissemination of biological progress on farms (among others introduction into cultivation of new more prolific cultivars, resistant to diseases and unfavourable natural conditions, implementation of advances in breeding as new and more productive animal breeds, but also measures for improving animal welfare).

However, irrespective of the definitions quoted above, it should be emphasized that a characteristic feature of implementing innovations in agriculture is the necessity to consider the specific conditions of this sector of economy, including the biological and spatial character of production, dependence of the production on the quality of agricultural productive space or seasonality of production (Kałuża &Rytel, 2010).

2   Data and Methods

The paper presents a fragment of research results focused on the state of knowledge assessment and learning farmers' opinions about the agricultural knowledge

and information system in Poland. Particular attention was attached to the identification of agricultural producers attitudes towards innovations in agriculture. It was studied how farmers perceive the presence of innovation brokers in the national system of agricultural advisory and what are their expectations from it.

The main research tool was authors' own survey questionnaire containing questions about, among others, the assessment of the current state of agricultural knowledge and information and innovativeness of Polish agriculture. Respondents were also asked to express their opinions about the necessity for changes in this area and for indicating key tasks, which an innovation broker in agriculture should face. The survey questionnaire was filled up by 76 respondents from the area of southern Poland. The group comprised farmers possessing agricultural holdings and conducting agricultural production, as well as persons closely connected with agriculture.

The studies were initiated in June 2017 as a part of the research project Capacity building in agricultural innovation services in CEE countries realised by the Hungarian "Discovery R&D Center, The Mendel University in Brno (Czech Republic), Wageningen University (The Netherlands), Slovak University in Agriculture in Nitra (Slovakia), Huddersfield University (Great Britain), Szent Istvan University (Hungary), Felso-Homokhatsag Videkfejlesztesi Egyesulet Local Action Group (Hungary) and the University of Agriculture in Krakow (Poland). The main objective of the project was addressing the emerging needs for developing the sector of innovative services for agriculture, including strengthening the cooperation between research units creating innovations and potential users of the conducted research results, through elaborating effective materials and training tools aimed to create, undertake and improve the activities connected with capacity building in the area of innovation services in the Central East European countries. Moreover, an attempt was made within the project to determine the expectations of so called final recipients (particularly farmers) concerning agro-innovation services.

3   Results and Discussion

One of the most serious encumbrances to building modern agriculture, capable of meeting the challenges of contemporary world markets is a relatively low level of rural dwellers' education (Table 1). The results of the National Census of 2011 show that the level of rural dwellers' education in Poland greatly differs from education of city inhabitants. However, the positive changes which have taken place over the recent years should be emphasized. In comparison with the beginning of the 21st century, the number of people in rural areas possessing tertiary

education increased. Still, persons with basic vocational and primary education prevail in rural areas in Poland constituting over a half of local dwellers.

Table 1 **Population aged 13 and more by education level (in %)**

Educational level	Urban areas			Rural areas		
	Total	Males	Females	Total	Males	Females
Tertiary	21,4	19,5	23,2	9,9	7,7	12,1
Post secondary and secondary	35,4	33,1	37,3	25,5	23,1	27,9
Basic vocational	18,6	24,2	13,8	26,6	33,5	19,6
Lower secondary	4,3	4,8	3,7	6,0	6,5	5,5
Primary	13,7	11,8	15,4	25,6	23,5	27,8
Primary not completed	0,9	0,7	1,0	2,1	1,6	2,7
Unknown educational level	5,7	5,9	5,6	4,3	4,1	4,4

Source: GUS, Rocznik Statystyczny Rzeczypospolitej Polskiej 2015, Warszawa, pp. 210-211.

The data presented above correspond with the results obtained in the conducted survey investigations. It was noticed, that respondents with secondary education made up the highest percentage of the studied sample, i.e. 66% of the total surveyed number. Over 10% of farmers finished their education on vocational school level.

The level of farmers' education indirectly translates into their willingness for innovation. According to Rogers (1983) farmers may be divided into five groups by their inclination towards changes. Innovator farmers (Innovators), pioneers (Early Adopters), Early Majority, Late Majority and Laggards. Such division assumes that only a small part of farmers – innovators and early adapters possess a sufficient knowledge and skills, which actively contribute to the transformations happening in agriculture. These are the ones who, through seeking and implementing innovations on their farms make possible knowledge and information spreading among the other farmer groups, usually less educated and with a lesser need for action.

The farmers included in the studies came into ownership of their farms mainly by way of inheritance. Among the discussed number of respondents almost 60% were farm owners aged below 25. The others were characterized by the average age about 40, which according to Kałuża and Ginter (2014) and Lewczuk and Bórawski (2000) means that they are at the highly mature age and emotionally attached to their farms owing to a long-term practice and huge amount of work they invested in them.

All farm owners participating in the studies assessed their farms positively regarding them as developmental. However, they did not present optimistic attitudes concerning the assessment of the level of Polish agriculture innovativeness. Comparing it with other West European countries, they mostly regarded the state of Polish agriculture development as low or at most average (Figure 2). None of the respondents assessed the development of domestic agriculture on a very good level, whereas only two persons indicated "good" category. The respondents emphasized strong diversification of innovativeness development depending on the size or economic power of farms, indicating a higher level on big and very large farms (of several hundred ha and bigger) and very low level on the smallest farms, with the area below 5 ha.

Figure 2 **Assessment of the level of innovativeness in Polish agriculture acc. to respondents (in %)**

Source: Own studies.

The respondents saw the causes of such low assessment of innovativeness in Polish agriculture in the first place in the lack of knowledge about modern solutions applied in agriculture (particularly in the area of technological consultancy) and low level of cooperation between the science and practice. Another important issue emphasized by the farmers were problems with access to financial means offered to farmers on preferential terms and ensuring the continuity of funding, without which any investment which requires considerable outlays became in the eyes of farmers fraught with too big risk or even impossible to realize. Further, the respondents indicated the issues of farmers' unawareness of the necessity to introduce innovations, which is a direct outcome of low developmental needs among the owners of the smallest farms, low education level usually hindering making the proper decision in response to contemporary challenges of the European and world agricultural markets, and finally low openness of farmers to changes (Piecuch and Płonka, 2017). Obtained research results corroborated the Authors' assumptions that the current agricultural advisory system in Poland does not produce the results satisfactory for farmers, particularly concerning the implementation of innovative solutions in agricultural holdings.

The respondents were definitely cautious while assessing their own skills and the state of knowledge about seeking and introducing changes on their own farms. They declared general knowledge on the subject, still it is far from comprehensive and detailed to be regarded as fully satisfactory. However, they perceive the necessity for upgrading the level of their knowledge, skills and professional competence as a necessary element of knowledge transfer for implementing new solutions. Therefore, a vast majority of them have already taken some actions in this direction, seeking knowledge and information in various possible places. Internet proved the basic source of knowledge for farmers (86% of respondents). Over 65% of farmers participated in trainings offered by various institutions (Figure 3). These were usually basic trainings, rarely specialist ones. Another important source of information (mainly in the area of agricultural production and CAP financial support) for almost 70% of the surveyed were Agricultural Advisory Centres. As has been mentioned before, such big role of these types of information results from farmers' trust in the consultants and their competences. Still, the respondents emphasized that in the framework of these consultations they did not receive sufficient information about modern technological possibilities and current educational offer, particularly in the field of technological consultancy. The information passed by the rural communities, including the neighbours and family also proved helpful. Seeking new solutions and farmers cooperation with universities and R&D units constituted a very small share in knowledge transfer. Only 9 respondents were using the subject literature, whereas only one person actually met an innovation broker.

Figure 3 **Sources of knowledge and information about innovative solutions in agriculture in respondents' opinions (in %)**

Source: Own studies.

Conducted studies allow to notice that 99% of the respondents never encountered in everyday life either the innovation broker term or innovation broker in person. Only a single farmer indicated that he used the services of this specialist (Figure 4). The others have never used this type of assistance or undertaken collaboration with public or scientific institutions, where a broker would intermediate. On the

other hand, once the "figure" and role of innovation broker in agriculture were explained, the respondents unanimously highlighted the necessity to refine the present system of knowledge transfer by adding the broker link. None of the respondents objected to it, therefore confirming a perceptible gap in the information flow and cooperation between the sphere of research (i.e. representatives of research and science world) and agricultural producers. A similar distribution of answers was noted for the questions concerning the respondents' willingness to use the services offered by innovation broker in agriculture. They unanimously indicated that, if the person of innovation broker appeared in the currently functioning knowledge transfer system and were available to them, they would definitely use his services, expecting a systematic cooperation and assistance in solving problems on farms.

Figure 4 **Respondents' opinions on the recognizability and necessity to introduce innovation broker into the agricultural knowledge and information system (in %)**

Source: Own studies.

In the light of the expectations presented towards innovation brokers in agriculture, the respondents revealed a wide variety of recommendations. Emphasizing the key role of brokers in dissemination and upgrading farmers' knowledge and skills concerning application of innovative solutions in the process of production and farm management, they indicated the necessity for trainings, information transfer and promoting the examples actually affecting the profitability of agricultural production. They sought the possible increasing of farmer willingness for seeking and implementing innovations in workshops, field trips and presentations of innovative solutions in practice. Among the tasks realized by innovation brokers for agriculture and farms were also financial issues, perceived as

increasing accessibility to the EU assistance funds, grants for innovative solutions or granting preferential loans.

4   Conclusion

Despite the existing agricultural knowledge and information system in Poland, one cannot help feeling that it does not utilise its full potential. This unfavourable situation is in the first place due to a most limited collaboration and links between it individual elements, which would make possible their interaction and functioning as a whole. In result agricultural knowledge usually remains in total isolation from real needs and expectations of its recipients, i.e. agricultural producers. On the other hand, universities and research institutes, because of a lack of cooperation with farmers, are unable to fully utilise their potential, which might serve the very necessary process, such as marketization and improving effectivity of agrifood economy. Therefore, despite the size and high quality of possessed intellectual potential, the effects of agricultural knowledge transfer system functioning are worse than might be expected.

On the basis of conducted studies it was found, that there is a need to disseminate the knowledge on innovations and their implementation process on farms. The respondents assessed the level of Polish agriculture innovativeness as low in comparison with other West European countries. The farmers emphasized that the knowledge in this area available to them is usually general and without support from the practical side. Lack of knowledge in the field of modern solutions applied in agriculture, insufficient financial means, low level of cooperation between the science and practice and low openness of farmers to changes were regarded as key barriers to the development of Polish agriculture innovativeness. The respondents rightly identified the increase in innovativeness as one of the major needs on the way to their farms and whole agricultural sector development. Moreover, they assessed positively introduction of innovation brokers to the agricultural knowledge and information system. They pointed to their key role in promotion and upgrading farmers' knowledge and skills for the application of innovative solutions in the production process and farm management.

Acknowledgements

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METHODOLOGY OF TRAINING FOR AGRICULTURAL INNOVATION BROKER

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Abstract

The paper is focused in the first part on the evaluation of the current situation of the transfer of innovation in agriculture extension in the Czech Republic, finding strengths and weaknesses in the counseling system. The second part of the paper addresses the question of what skills and knowledges the agricultural innovation brokers should manage and what methods could help to acquire this knowledge and skills. The results of the paper are part of international project "KA2 – Cooperation for Innovation and the Exchange of Good Practices, Strategic Partnerships for vocational education and training".

Keywords: *Agribusiness, Agriculture extension services, Agriculture Innovation Brokering, Innovation training, lerning*

JEL Classification: *Q12, Q13, Q16, Q18*

1   Introduction

Transfers of knowledge and information system in agricultural in the Czech Republic and most of the EU countries is dominated by public sector, where science is created by state universities and scientific research institutes with their experimental stations (MZE, 2016). The concepts emerging there are transferred to public advisory units to be finally passed by agricultural advisors to their recipients – farmers. According to (MZE, 2016) in the Czech system of agricultural

knowledge and information is the strongest relationships between farmers and various associations (Agrarian Chamber, Vegetable Union, Association of organic production etc.), whereas the links among the other subjects participating in this system are slight and sometimes even missing. The biggest gap is in the interconnection of research organizations (especially universities) and recipients of advisory services – farmers. Agricultural advisory as the main channel of information flow between the sphere of scientific research and agricultural producers, undertakes cooperation with various research centres to transfer knowledge to farmers, which leads to implementation of innovative solutions concerning organization of agricultural production, efficiency of applied technologies, development of farms and methods of their management. Persons engaged in the education system are responsible for updating the current knowledge and seeking new and original solutions to be used both directly by farmers as such and the units from the environment of agriculture. Owing to them it is possible to maintain and improve agricultural knowledge and information in the Czech Republic. The source of innovation is basically the problems emerging during the production process, which individual farms are unable to solve using the knowledge or technology they possess at the time. It is necessary to introduce some changes concerning the technology of production or organization of work or improvement of marketing and sales, or discovering new solutions. Taking into account the existing and constantly emerging new problems, there is an apparent need of transfer of modern and already known organizational or technological solutions and practical applications on a large number of farms.

2   Data and methodology

Results of this research are part of international project "KA2 – Cooperation for Innovation and the Exchange of Good Practices, Strategic Partnerships for vocational education and training" (Catalyst Project). At this part of research participated 17 respondents (10 farmers / agricultural companies) and 7 agricultural organisations, including Agrarian Chamber of the Czech Republic, Ministry of Agriculture of the Czech Republic. The survey was carried out through a guided interview in the period from 3th of March to 19th of May 2017. The results take into account also consultations and outputs of Multiple Event held on 13th of June 2017 at FRRMS MENDELU. On the Multiple Event participated in addition to farmers also Innovation Broker, Experts from three Czech universities and

Experts on the transfer of technology transfer in agriculture in the Czech Republic. Representatives of individual groups were asked open questions:

- How the process of agricultural innovation takes place in the Czech Republic / organization,
- Examples of agricultural innovation in the Czech Republic / organization,
- Information about the knowledge and skills farm advisors and consultants need..,
- The training and support available to Czech farmers / respondents,
- The future of agricultural innovation in the Czech Republic / in case of organization.

The level of innovation in the Czech agriculture has been estimated as medium (in comparison with Western Europe – Netherlands and United Kingdom). The results of the interviews for individual groups were entered into the following tables (see results). Based on findings from the survey, methods of training of innovation brokers in agriculture (Quick decision making, Beer Game, Teamwork, Mind Map) were proposed. Subsequently, the relevance of each method has been evaluated during second Multiple Event on 8th of March 2018 at FRRMS MENDELU. At this event cooperated 20 External Participants (Farmers, Food processors and representatives of research institutions), each participant tried and tested each method and then evaluated it. The evaluation was carried out by evaluating the following queries:

- How much the training contributed to the desired skills,
- How useful did you find this training,
- To what extent do you think the exercises were thought-provoking,
- How effective were the discussions during the event,
- Rate the atmosphere of the training,
- Rate the organisation of the training.

3   Results

The following Table 1 – 4 represent the results of the interviews for individual groups. The main focus was on the following three criteria:

- Innovation and trainings,
- Innovation capacity,
- Innovation and partnerships.

These three criteria are evaluated in each table from the point of view Weaknesses and Strengths. The last two fields in the table represent very important

knowledge about the desired skills of farm advisors and consultants and knowledge of farm advisors and consultants.

Table 1 **Farmers / farmer organisations**

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Weaknesses	- Important is the choice of the term (seasonality plays an important role with farmers). - If the training is outside the production season, there is a higher chance of participation. - Motivation for participation can be: foreign experts, affordable price, benefits, practical demonstrations, cultural program, etc.). - Little access to capital. - An aging population of farmers (low share of young farmers).	- Many innovations do not get to practice. There is still a barrier between academia (universities) and practice. - There is a general lack of innovative experts, often foreign consultants are invited, which leads to higher costs. - The counseling system is not so flexible. - Farmers often do not have the exact clue how to get innovative advice (they often use contacts acquired during University studies).	- Many farmers would like to participate in an innovation partnership, but perhaps only a minority would be willing to contribute financially. - There is a general expectation that the outcomes of innovation will be provided to farmers free of charge. - Language barrier for farmers in the case of an international partnership.

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Strengths	- Each agricultural sector has its own professional associations that provide advice and organize meetings of farmers at different levels. - The long tradition of union functioning, the organization of trade fairs, including professional lectures and training.	- There are already projects (such as the Czech Technology Agency, the Ministry of Agriculture, the Ministry of Industry and Trade), which directly support or condition cooperation on innovation. - If the proposal of innovative character (assessed by an expert commission), the cooperation of the agricultural enterprise and the academic sphere is financially supported. - "Innovation" is one of the points of the rural development program in the Czech Republic in 2014-2020.	- Generally, there is an increasing interest in innovation, which is also financially supported. - There are successful innovations that serve as good advertising that makes sense.
Desired skills of farm advisors and consultants	Ability to speak to farmers in their "language", to listen to their needs, to transform the scientific output into a comprehensible and applicable form. Openness to innovations emerging in the world of science and business. Readiness for upgrading their knowledge concerning introducing innovation-driven systems of agricultural production or farm management.		
Desired knowledge of farm advisors and consultants	To have agricultural education, to understand current problems in agricultural practice, to participate in educational activities (training, courses), reading professional journals. To have knowledge about the processes occurring on the domestic and international agricultural markets. Understand the principle of commercialization of science and research from the academic environment into practice.		

Source: Interview with interest groups, Catalyst Project (2017).

Table 1 summarizes the results of the interviews with representatives of Farmers and farmer organizations.

Table 2 **Researchers / research institutes**

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Weaknesses	- Many researchers end their project by writing an article or final report. (only a small part of them has an overlap in practice). - Sometimes there is a strong barrier between the academic environment and the business sector. - Lack of interest among researchers in the problems which farmers must solve and reluctance to share the obtained results. - The technology transfer system is not sufficiently well-known for some employees.	- The primary objective of the university is pedagogical and scientific research. (these outputs are mostly financed). - So far, there is little interest in working directly with practice or training companies. Sometimes money is missing to protect and transfer the intellectual property product into practice.	- Partnerships between the university and business organizations are mainly based on a common project plan (Often the grant provider is required to cooperate). - The interest of companies in direct, project-free cooperation with the university is rare. - Agricultural knowledge is sometimes created away from the real needs and expectations of farmers.

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Strengths	- The university has the latest technology, knowledge and equipment to make it an interesting partner for the business environment. - The number of protected outputs of intellectual property is rising sharply. - The university presents its outputs at various events and fairs, raising the awareness of MENDEL. - There is a wide range of graduates who still have contacts at the university and can now use them for potential collaboration. - Majority of academic teachers have enough competences to act as innovation brokers in agriculture.	- An important advantage is the establishment of a central workplace - Mendel Technology Transfer Center, which is concerned with the protection of intellectual property, analysis, development and utilization of the commercial potential of intellectual property of the university. - The aim of the Center is to extend and intensify the cooperation of the University with companies interested in using the special instrumentation and laboratory equipment or the knowledge potential and scientific results of the University. - Regularly organized seminars on various topics of technology transfer are gradually increasing the awareness of researchers in this field.	- The already implemented application of the intellectual property product of a university (eg patent) in practice serves as a good example and motivation for researchers. There are a number of licensed licenses for inventions, procedures, or know-how. - Companies that buy these products will not only get innovation on their own, but will be able to benefit from the collaboration with the university within their PR. The existence of a proof-of-concept project that has been implemented since 2016 is directly geared towards bringing the interesting and potential output of science and research into practice. - Newly established cooperation with Louisiana State University, which has long experience with technology transfer, can bring many benefits.

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Desired skills of farm advisors and consultants	To have an overview of current outcomes in various fields of the university environment (Be able to transform these outputs into a comprehensible form). Be aware of what are the topical issues that businesses are addressing, the challenges they face, and the ability to connect them.		
Desired knowledge of farm advisors and consultants	Possessing not only theoretical but first of all practical knowledge about agricultural production process (Having knowledge of agriculture and product processing). To understand the principle of commercialization of science and research from the academic environment into practice.		

Source: Interview with interest groups, Catalyst Project (2017).

Table 2 summarizes the results of the interviews with representatives of Researchers and Research institutes.

Table 3 **Farm advisors/Agricultural VET providers**

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Weaknesses	- Not directly linked to agricultural education system, with universities and research institutes (Innovation brokers are organized by Ministry of Agriculture), - Advisory services are focused primarily on obtaining funding through EU projects, whereas far less on helping framers to overcome other problems,	- Not enough specialists suitable for current advisory service, - Poor equipment in modern technologies (IT, GPS), - Insufficient financing and Short-term objectives based on the current program (The support is based on the European Innovation Partnership initiative "Productivity and Sustainability of Agriculture").	- Lack of collaboration (it should be emphasized that the relationships between farm advisor and farmer are close to ideal). - Limitations appear connected with weak links between the elements of agricultural knowledge and information,

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Strengths	- Free advisory services of high quality, - The results of the innovation process are free and available to everybody, - farmers' trust an official infrastructure, a network of units taking into account administrative division of Czech Republic,	- Qualifications and experience of farm advisors, - Organizational background, - Ability to use modern means of communication and transfer of knowledge in contact with farmers and rural inhabitants	- Qualified advisory staff, highly experienced in work with farmers and rural inhabitants.
Desired skills of farm advisors and consultants	Ability to understand and accept real needs of farmers, Flexible approach and mobility of the advisors, Openness to cooperation with farmers and good communication skills with farmers and rural inhabitants		
Desired knowledge of farm advisors and consultants	Knowledge about legal aspects of running a business but also operating in the EU Technological knowledge connected with the process of production, Knowledge about agricultural farm management, Some knowledge about finances and bookkeeping.		

Source: Interview with interest groups, Catalyst Project (2017).

Table 3 summarizes the results of the interviews with representatives of Farm advisors and Agricultural VET providers.

Table 4 **Chamber of Agriculture**

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Weaknesses	- Low flexibility to receive innovations and small openness to changes, - Little cooperation with universities.	- Insufficient budgetary grants, - Poor equipment in IT and modern telecommunication appliances.	-Poor connection between the elements of agricultural knowledge and information system.

	Innovation and trainings	Innovation capacity	Innovation and partnerships
Strengths	- Cooperation with research institutes, - Respect in the farmer community, - Political force in negotiating and promoting the interests of farmers - Transfer of knowledge and experiences corresponding to real problems, - openness and willingness to participate in trainings and study visits, - promoting new solutions among farmers (members).	Support of members to get their product to market (Farmers markets), - Opening markets for regional and traditional Czech producers, - Competition from large and economically strong farms enforces cooperation and consolidation of small producers, who in this way are able to compete on the market.	- Strengthening cooperation with advisory units, particularly concerning obtaining EU funding and specialist technological solutions used in production, - Strengthening the contacts and building partner relations with universities and research centres, - signaling needs and expectations of agri-producers at various meetings with representative of science, government and local government administration.
Desired skills of farms advisors and consultants	Ability to transfer knowledge to agri-producers, Ability to cooperate both with farmers and academic staff, openness to innovations appearing in the world of science and business, Readiness to upgrade their knowledge on introducing innovative systems to agricultural production or farm management, Communication skills and ability to accept real needs of agri-producers.		
Desired knowledge of farm advisors and consultants	Knowledge about business project management, Knowledge about the processes occurring on the domestic agricultural markets, Knowledge of technology (basic practical knowledge), Knowledge of agricultural production and agricultural economics, Knowledge concerning legal aspects of financial support for agricultural activities and operating within the EU structures.		

Source: Interview with interest groups, Catalyst Project (2017).

Table 4 summarizes the results of the interviews with representatives of Chamber of Agriculture. From the results of interviews (Table 1-4), specifically from the last two fields "Desired skills of farms advisors and consultants" and „Desired knowledge of farm advisors and consultants", have been proposed basic concept of Tasks and responsibilities, Required knowledge and skills for Agriculture Innovation Broker (hereinafter AIB).

The role of AIB means to manage following tasks (GODA, 2017):
- Find a suitable source of funding: cooperation in developing business plans for the undertaken investments, feasibility studies and seeking the sources of funding for them.
- Creating links between business + cooperative cooperation: understand the functioning of vertical integration mechanisms in agribusiness and be able to identify opportunities for the actor in this respect.
- Understand the functioning of the entire supply chain: identification of partners in the environment in which the AIB operates. Owing to the identification of potential partners, who wish to work for innovations in the areas of agriculture, forestry, food production and carry out measures to activate rural inhabitants, the broker is able to suggest solutions adequate to the needs.
- Teamwork + Formal documents: participation in creating teams of partners with a common goal and to be able to develop activity plans for the teams / groups. The AIB should possess adequate skills to be able to help prepare formal documents necessary for the group functioning (agreements).
- Monitoring and final evaluation: monitoring of the team / group function / outputs and how the project goals are achieved (continuously and at the end of the project).
- Membership in stakeholder's organization: participation in the meetings important from the point of view of interested stakeholders (Local Action Groups, Chambers of Agriculture, fairs, exhibitions).

In order to make possible realization of the above mentioned activities, the role and position of AIB should be clear. AIB must reveal a set of personal characteristics, including (Klerkx, L. P., et al., 2016):
- To understand the sociological links in agriculture and to be able effectively communicate with people in the rural areas.
- Ability and willingness to work in a team / group.
- Knowledge about the partners within the created teams / groups and the sector supply chain in which they operate.

- Understanding and acceptance of the attitudes of all partners from different branches and areas of activity.
- Ensuring the transparency of the process of partner relationships forming (e.g. cooperatives).
- Ability to identify the main goals and issues that need to be addressed (briefly and clearly) acceptable by all stakeholders at simultaneous striving for the greatest possible share of the partners in the process of their formulating.
- Avoid asymmetry of information between individual partners, make sure that they understand each other and accept their decisions and the need for cooperation.

3.1 Selected methods of training and their evaluation

Requirements for position of AIB are very wide and they can't be all fulfilled within certain time options and predispositions of future training. In principle, it is more about the requirements for creating a functioning network. This process of innovation involves: embedding, dissemination, realisation, development, planning, inspiration and thus initial idea (Wielinga, H.E., 2009). For this reason, attention was focused on the most important and most frequently requested skills and abilities for AIB. The following 4 methods of training AIB were proposed for the first phase of training.

Quick decision making

This is an activity that encourages participants to make their ideas become creative and share it with others. Participants will learn the values of quick thinking and quick judgment, because sometimes it is necessary to rely on good instinct and quickly decide and thus save time to find solutions. If the participants are familiar with each other or they are from the same organization, a common issue can be chosen as the main topic that will be solved in the brainstorming exercise (Clawson, 2006).

Tables 5, 8, 11 and 14 show the results for the question "How much the training contributed to the desired skills".Impact of the results (no impact, low, medium, high) is designed according to frequency of points for each answer. Respondents rated each question in the following way 1 point = no impact, 2 points = low, 3 points = medium, 4 points = high.

Table 5 **How much the training contributed to the desired skills?**

a – Networking	HIGH
b – Communication	HIGH
c – Project management	MEDIUM
d – Innovation management	MEDIUM
e – Data management	HIGH
f – Marketing, Innovation promotion	NO IMPACT
g – Problem solving	HIGH
h – Concept thinking	HIGH
i – Analytical thinking	MEDIUM
j – Critical thinking	HIGH
k – Leadership skills	NO IMPACT

Source: Interview with interest groups, Catalyst Project (2018).

Tables 6, 9, 12 and 15show the results of questions:
B1 - How useful did you find this training?
B2 - To what extent do you think the exercises were thought-provoking?
B3 - How effective were the discussions during the event?

Table 6 **How useful and effective is the training?**

B1	HIGH
B2	MEDIUM
B3	MEDIUM

Source: Interview with interest groups, Catalyst Project (2018).

Tables 7, 10, 13 and 16shows the results of questions:
C1 - Please rate the atmosphere of the training!
C2 - Please rate the organisation of the training!

Table 7 **What is the atmosphere and organisation of the training?**

C1	HIGH
C2	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Beer Game

The intention of the game / simulation of the Beer Game is to provide a direct experience with the effects of system dynamics in commodity chains of agribusiness. Beer Game is one of the most significant management games in system dynamics and supply chain management. The participants of the game (individuals, groups) have the task of managing (inventory management, ordering) the assigned enterprise that is part of the customer-supply chain. Through this method of learning the participant has the opportunity to learn how the structure of the chain and the lack of coordination between the actors influence the choice of actors' actions and, ultimately, the performance of the company. Through this direct experience, participants have the opportunity to understand the interdependence between businesses and to understand the need to find solutions based on coordination and cooperation with other businesses in commodity chains (Mayer, 2008).

Table 8 **How much the training contributed to the desired skills?**

a – Networking	NO IMPACT
b – Communication	LOW
c – Project management	NO IMPACT
d – Innovation management	NO IMPACT
e – Data management	NO IMPACT
f – Marketing, Innovation promotion	NO IMPACT
g – Problem solving	HIGH
h – Concept thinking	HIGH
i – Analytical thinking	HIGH
j – Critical thinking	HIGH
k – Leadership skills	NO IMPACT

Source: Interview with interest groups, Catalyst Project (2018).

Table 9 **How useful and effective is the training?**

B1	HIGH
B2	HIGH
B3	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Table 10 **What is the atmosphere and organisation of the training?**

C1	HIGH
C2	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Teamwork

The main purpose of this methodology is to suggest how important and effective teamwork is. The main objective of this methodology is to analyse the differences between individual and team decisions (Clawson, 2006).

Table 11 **How much the training contributed to the desired skills?**

a – Networking	HIGH
b – Communication	MEDIUM
c – Project management	HIGH
d – Innovation management	HIGH
e – Data management	HIGH
f – Marketing, Innovation promotion	HIGH
g – Problem solving	HIGH
h – Concept thinking	HIGH
i – Analytical thinking	HIGH
j – Critical thinking	HIGH
k – Leadership skills	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Table 12 **How useful and effective is the training?**

B1	HIGH
B2	HIGH
B3	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Table 13 **What is the atmosphere and organisation of the training?**

C1	HIGH

C2	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Mind Map

Mind mapping is a creative and logical tool to record and create notes that "mapped" ideas. Its purpose is to convert monotone information into a colorful and highly organized chart. Thought map can be compared with city map. The center of the city is the main idea, the main roads leading from the center are key ideas in the thought process, the secondary paths (branches) are secondary ideas, etc. Special pictures or shapes can be indicative points of interest or particularly important ideas (Clawson, 2006).

Table 14 **How much the training contributed to the desired skills?**

a – Networking	MEDIUM
b – Communication	HIGH
c – Project management	LOW
d – Innovation management	LOW
e – Data management	NO IMPACT
f – Marketing, Innovation promotion	NO IMPACT
g – Problem solving	NO IMPACT
h – Concept thinking	MEDIUM
i – Analytical thinking	NO IMPACT
j – Critical thinking	NO IMPACT
k – Leadership skills	NO IMPACT

Source: Interview with interest groups, Catalyst Project (2018).

Table 15 **How useful and effective is the training?**

B1	HIGH
B2	HIGH
B3	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

Table 16 **What is the atmosphere and organisation of the training?**

C1	HIGH
C2	HIGH

Source: Interview with interest groups, Catalyst Project (2018).

4 Conclusions

Innovations are widely accepted in particular by large agriculture holdings. In this regard, the Czech Republic has the advantage compared to other EU countries (Due to its largest average size of farm). The production core of agriculture in the Czech Republic belongs to enterprises which are operating on 500 – 1000 ha. These holdings have usually no problem with the acceptance of innovations and are able to provide innovative processes on a long-term basis by their own means. Other smaller businesses, especially the smallest family farms are very flexible in decision-making, but the innovation process is very costly for them, so there is a considerable dependence on subsidies and public sector assistance for these businesses. This creates a strong diversification depending on the farm area or their economic strength – high level of innovation on large farms and very large farms (of several hundred hectares and larger) but very low on the smallest farms whose farm area does not exceed 5 ha.

In the Czech Republic, there has been a long-term system for the dissemination of innovation in agriculture provided by the Ministry of Agriculture in co-operation with Institute of Agricultural Economics and Information. Support for innovation is also based on the European Innovation Partnership initiative "Productivity and Sustainability of Agriculture". Thanks to this initiative are trained and working innovation brokers in agriculture in the Czech Republic. This program focuses on the following objectives:

Increased agricultural productivity, economic viability, sustainability, output and resource efficiency, Innovation to support bio-economy, Biodiversity, eco-system services, soil functionality and sustainable water management, Innovative products and services for an integrated supply chain, Opening new product and market opportunities for primary producers, Quality and food safety and a healthy lifestyle,

Reduction of post-harvest losses and waste of food. However, through innovative brokers is supported only the first objective (Increased agricultural productivity, economic viability, sustainability, output and resource efficiency) of this initiative in the Czech Republic. Thanks to this the innovative system through innovative brokers is not complex. Innovation brokers are working only at the

primary production level (only with farmers). They do not interfere with other parts of the commodity chain. There is also missing is the link with science and research, innovative brokers are being trained by the Ministry of Agriculture in cooperation with Institute of Agricultural Economics and Information. However, there is no comprehensive study program at universities in the Czech Republic that would focus on issues of technology transfer in agriculture and innovation advices.

The other reasons for these problems in innovation process in Czech agriculture are lack of awareness of introducing innovations perceived among farmers as such, which was a direct effect of small development needs voiced by the owners of the smallest agricultural holdings.

Problem with availability of funding offered on preferential terms, without which any investment demanding considerable financial outlays in the eyes of the surveyed persons presented too much risk or even was impossible to realize. Lack of knowledge about modern solutions applied in agriculture, small openness of farmers to changes and low level of collaboration between the science and practice. Economic advisory services for agriculture supported by the public sector currently do not exist, mostly technological and technical consultancy.

From the survey conducted, have been discovered the required assumptions for position of AIB. Position of AIB denotes focussing on very wide area and following issues:

- establishing contacts and suggesting partnership agreements comprising agro producers, science and business representatives operating on the basis of agricultural production, distribution and logistics,
- presentation of needs, which emerge in the area of agricultural production to research workers of universities and research institutes,
- seeking sources of funding for the investments realized in the area of agricultural production to increase its effectiveness including developing of a project proposal,
- innovation broker should be involved in a good innovation project development, his/her knowledge may improve the chance to obtain proper funding for this project.
- discovering innovative patents and technologies, which are created or have been implemented in the economic sphere by universities and research institutes.

Therefore, from the above-mentioned requirements following were selected for which the appropriate training methods were selected: Networking, Communication, Project management, Innovation management, Data management, Marketing, Innovation promotion, Problem solving, Concept thinking, Analytical

thinking, Critical thinking, Leadership skills. These requirements have been tested in all selected methods (Quick decision making, Beer Game, Teamwork, Mind Map). It has been verified, that the selected methods meet the selected criteria, i.e. they are therefore suitable for inclusion in innovative training of AIB.

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CHINESE AGRARIAN SECTOR DEVELOPMENT, AGRICULTURAL DEVELOPMENT AND RURAL LIVELIHOOD IN PROVINCES

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Abstract

The paper is focused on the evaluation of development of the Chinese agrarian sector and the subsequent expression of the relationship between agricultural development and rural livelihood. The characterization of processes is related to this issue, especially in the area of economic development and agriculture. Development trends of the Chinese primary sector are explored and individual sectoral changes are evaluated to deal with the construction of a composite indicator, which makes it possible to define relatively the level of the individual provinces of China, both in terms of rural livelihoods and in terms of agricultural development.

Keywords: *Agriculture, composite indicator, development, People 's Republic of China, province, rural livelihood*

JEL Classification: *A14,E01, Q13*

1   Introduction

Significance of agriculture has changed during the last few decades and its transformation can be observed differently in each part of the world. Globalization plays an important role in the whole process. Removal of trade barriers has

resulted in interconnection between regional and global markets. This trend is closely related to gradual creation of commodity chains which comprise all stages of production, from single farmer to final consumer. Individual countries have been focusing on production of commodities and goods in which they are able to have competitive advantage. Therefore, agriculture is no longer perceived only as a sector which is securing production of food for the population for either direct consumption or food processing. Its traditional mission has turned into a business which seeks to satisfy demand of developed society all over the world by the economies of scale. It still applies that agriculture plays a very important role in the economic life of people living in rural areas, especially in developing world. Either world or domestic market influences their decision about what kind of commodity they should produce in order to get a higher profit. And as the country develops, rural labor moves to the secondary and tertiary sectors seeking higher wages than they are in unpredictable agriculture. And that is the example of China, a diverse country which used to be a nation of farmers. With the gradual opening of China to the world, changes in the inter-sectoral structure has been on the rise due to progressive industrialization and country 's strong leadership. As a result, population 's standard of living has significantly increased and the level of poverty has been successfully reduced. At the same time the agriculture still remains a sector which employs half of working population and provides an income for several a million households.

2   Data and methodology

Composite indicator

Composite indicator is constructed by combination of few variables, which are frequently introduced in different units. It can also be said that these sub-indicators have different variability, importance and mutual dependence within individual pairs (Minařík et al., 2013). Composite indicator is a useful tool to compare performance of countries and to illustrate comprehensive issues in different fields of study. Based on observed data, the indicator can reveal relative positions of countries, regions, etc. in a given area (OECD, 2008). In order to assemble the composite indicator, it is necessary to follow these sub-steps:

Selection of sub-variables

Initially it is important to realize which sub-indicators are desirable for constructing of the composite and which phenomenon will be measured. It is necessary to work with relevant data which are not be distorted by different measurements within individual statistical databases (OECD, 2008). It is then necessary

to distinguish for which indicators achievement of the greatest value is required. These are e.g. level of education, employment, business growth, etc. and they are marked as MAX type indicators. Second criterion is MIN type values for which it is desirable to achieve the lowest value (e.g. criminality, mortality, level of emissions). The optimal type criterion which includes median age or fertility does not constitute a separate group inasmuch it is easy to convert it into min type. Furthermore it is essential to realize also importance of statistical criterions and take into account possible distortion by extreme values or asymmetric distribution of data (Minařík et al., 2013). Two sets of variables had to be selected in order to cover information about mentioned areas of interest. The first set involves indicators dealing with agricultural development of China. The second set is composed of indicators evaluating level of rural livelihood. Some indicators had to be calculated from more variables due to missing of concrete indicator in the statistical database or in order to convert it to a comparable indicator. Furthermore, input data for this analysis are calculated by arithmetic mean of years 2009 – 2012.

Missing values

When using secondary data that are ordinary available, it is common for some values in the file to be missing. In spite of this, the data can be further processed however the proportion cannot be more than 5 % of the total data. One of the possible solutions is a suitably chosen method of aggregation. The second is to add missing values using an algorithm or try to calculate the missing value based on strong correlation of given indicator with some other variable (Minařík et al., 2013).

Weighting

Majority of composite indicators rely on the technique of equal weighting what in general means that each variable is given the same weight. This manner is used e.g. when author does not have sufficient knowledge about relationship among variables or it can cover up the absence of a statistical or an empirical basis. Nevertheless it doesn´t mean that variables are without the weight but that their weight is simply equal (OECD, 2008). "Easier" methods of determination of weights are according to Jadczaková (2016) as follows:

– *Rating scales* – its use is generally with odd number of rates (1, 3, 5, 7, 9) which can be according to their importance explained by words as low, below average, average, above average and high. Then standardization is performed by dividing of number of points reached by given indicator by the sum of total points of all indicators. Total number of resulting weights must be equal to one.

- *Matrix of pairwise comparison* – this method uses p×p matrix (chart) in which indicators are being compared in pars by following procedure: if the indicator from the row is considered as more important than the indicator from the column, then „1" is assigned to the row indicator and „0" to the column indicator. If both indicators have the same importance, we assign „0.5" to each of them. Whereas it is pointless to equate the indicators with themselves, diagonal fields remain empty. In the end, row sums of matrix are divided by its total sum through which are gradually calculated individual weights whose sum is again 1.
- *Preference matrix*– this serves as an alternative to the previous method. In this case, weights are determined on the basis of how many times row indicator is more important than column indicator and vice versa. Therefore we assign e.g. „3" to three times more important indicator and „1/3" to the second from the pair instead of „1", „0" and „0.5" as in Matrix of pairwise comparison whose least significant indicator gains zero weight (considered as method disadvantage).

All resources used for construction of composite indicator agree that for determination of weights expert approach is needed. Given that the experts have a different attitude towards the problem, resulting weights are then the average of individual ratings of single experts.

Standardization
Purpose of this step is to transform the original values of chosen indicators to dimensionless variables which are therefore easily aggregable. Different methods of standardization vary by their properties and may lead to different results. The most used methods are defined by (Minařík et al., 2013):

- *Ranking* – based on replacement of original values of measurable variable X_j by their ascending/descending order creating ordinal variable P_j. For MAX type indicators, sequence numbers are assigned in descending order. Opposite assignment (ascending order) is valid for MIN type indicators. By this method can be lost part of information contained in the data.
- *Z-scores* – again replaces a dimensional variable X_j by dimensionless:

$$U_j = \frac{X_j - \bar{x}_j}{\sqrt{var\ x_j}}, \ (1)$$

- with zero mean ($\bar{u}_j = 0$) and variance:

$$\left(var\ u_j = \sqrt{var\ u_j} = 1 \right), \ (2)$$

– for MAX type indicator. For the second type of indicator (MIN), transformation is done by:

$$U_j = \frac{\overline{x}_j - X_j}{\sqrt{var\ x_j}}, \text{(3)}$$

– *Min-max method (re-scaling) – transforms the original scale on new range <0; 100>. For MAX type indicators* apply:

$$B_j = \frac{X_j - min\{X_j\}}{max\{X_j\} - min\{X_j\}} \cdot 100 \text{ (4)}$$

– *For MIN type indicators* apply:

$$B_j = \frac{max\{X_j\} - X_j}{max\{X_j\} - min\{X_j\}} \cdot 100 \text{ (5)}$$

In this formula $max\{X_j\}$ and $min\{X_j\}$ represent the greatest and the lowest value in the data set of *j*-indicator. Holčík et al. (2015) state that this method is recommended to be used in cases, where variables vary in scope but do not have normal distributions or contain outlying values.

Aggregation

This final summary (aggregation) is made regardless the type of standardization method used. For conversion of these transformed data into a composite indicator, two means of aggregation are used:
– *Weighted sum approach*- if there are no missing values in the data set
– *Weighted average approach*- in case of missing values in the data set

Result of aggregation is dimensionless composite indicator whose chosen method of standardization may influence final value of indicator. The value of composite indicator is a relative assessment within the examined set of variables. (Minařík et al., 2013).

The method of composite indicator has been applied in order to analyze the situation within individual regions and on the other hand examination of relationship between agricultural development and rural livelihood in China. To compare the situation and relation between these sectors it was necessary to construct two composite indicators in order to summarize more information into one complex index. Two sets of variables had to be selected in order to cover information about the areas of interest. The first set involves indicators dealing with agricultural development of China and the second set is composed of indicators evaluating level of rural livelihood. Some indicators had to be calculated from more variables due to missing of concrete indicator in the statistical database or

in order to convert it to a comparable indicator. Furthermore, input data for this analysis are calculated by arithmetic mean of years 2009 – 2012. Characteristics of examined data are displayed in the table 1.

3   Results

To compare the situation and relation between agricultural development and rural livelihood in China it is necessary to construct two composite indicators in order to summarize more information into one complex index. On the beginning of the analysis is important to have information about characteristics of examined data. Into this basic statistics belongs mean, median, maximum and minimum value of data set, variance, standard deviation, variation coefficient, kurtosis, skewness and finally correlation matrixes.

Table 1 **Basic statistical characteristics – indicators of rural livelihood**

Varia-ble	Mean	Median	Mini-mum	Maxi-mum	Variance	Std.Dev.	Coef. Var.
X1	6953.93	6134.58	3705.23	15079.60	8163703	2857.22	41.08785
X2	5119.79	4520.28	2693.90	10758.93	3689213	1920.73	37.51584
X3	36097.02	29518.50	15053.25	78488.50	315951204	17775.02	49.24234
X4	0.31	0.30	0.21	0.40	0	0.05	16.69443

Source: NBSC (2014), processed by author using Statistica.

Table 2 provides results of moment based coefficients of skewness and kurtosis.

Table 2 **Skewness and kurtosis –indicators of rural livelihood**

Variable	Skewness	Kurtosis
X1	1.520342	1.883027
X2	1.832362	3.058490
X3	1.289869	0.925631
X4	-0.003816	-0.861165

Source: NBSC (2014), processed by author using Statistica.

For determination of dependency and similarity within the indicators it is necessary to construct correlation matrix. To remind, value of correlation coefficient is each time in interval <-1, +1>. These borders represent the strongest relation compared to 0 which means that between the combinations of two variables exists

no correlation. In table 3 can be observed statistically significant correlations between all examined indicators. Value 0.96 meaning very high dependence can be found between per capita income of rural households and per capita consumption expenditure of rural households.

Table 3 **Correlation matrix – indicators of rural livelihood**

Variable	X1	X2	X3	X4
X1	1.000000	0.958722	0.923725	-0.556160
X2	0.958722	1.000000	0.872002	-0.413008
X3	0.923725	0.872002	1.000000	-0.586140
X4	-0.556160	-0.413008	-0.586140	1.000000

Source: NBSC (2014), processed by author using Statistica.

Value of correlation -0.41 between indicators per capita consumption expenditure of rural households and Engel's coefficient testify the lowest, although still moderate dependence. Based on these out- puts use of weighting will be applied within construction of composite indicator for first three indicators.

Table 4 **Basic statistical characteristics – indicators of agricultural development**

Varia-ble	Mean	Median	Mini-mum	Maxi-mum	Variance	Std.Dev.	Coef.Var.
Y1	5409.13	5293.86	1304.895	10310.17	4349298	2085.50	38.55516
Y2	32336.67	28149.07	9582.946	78092.57	261432626	16168.88	50.00168
Y3	0.52	0.46	0.238	1.06	0	0.23	44.62839
Y4	7.72	6.53	2.490	15.60	15	3.84	49.77093
Y5	0.46	0.47	0.109	0.93	0	0.23	49.55760

Source: NBSC (2014), processed by author using Statistica.

Table 4 displays basic statistical descriptions for second set of indicators. The highest mean and median value can be found in productivity of rural labor. The lowest and the most similar values of these measurements of central tendency have fertilizer investments. Productivity of rural labor has the most variable data and on the other hand irrigation index together with fertilizer investment indicate almost zero variance and standard deviation.

Table 5 describes asymmetry and peakedness of agricultural indicators. Compared to results of first set of indicators skewness of data are overall lower. It is

given by absence of outlying observations and greater uniformity of data around arithmetic mean.

Table 5 **Skewness and kurtosis – indicators of agricultural development**

Variable	Skewness	Kurtosis
Y1	0.113333	-0.239988
Y2	0.837563	0.548816
Y3	0.526956	-0.711642
Y4	0.580297	-0.817022
Y5	0.292857	-0.682532

Source: NBSC (2014), processed by author using Statistica.

Relationship and dependency between agricultural indicators are displayed in table 6. Values marked by red color indicate statistical significance. Yet it does not have to mean high correlation between two variables. The highest value of correlation coefficient from this set can be observed between irrigation index and power investment and between irrigation index and fertilizer investment as well. On the other hand the lowest dependence is presented between productivity of rural labor and power investment. Almost identical low correlation can be seen between gross output value of agriculture per capita and fertilizer investment. This matrix can be summed up that there is no great dependence between variables and therefore it can be used for composite indicator without weighting.

Table 6 **Correlation matrix – indicators of agricultural development**

Variable	Y1	Y2	Y3	Y4	Y5
Y1	1.000000	0.106365	-0.317661	-0.194448	0.034414
Y2	0.106365	1.000000	0.584638	0.033542	0.350584
Y3	-0.317661	0.584638	1.000000	0.628860	0.620877
Y4	-0.194448	0.033542	0.628860	1.000000	0.518474
Y5	0.034414	0.350584	0.620877	0.518474	1.000000

Source: NBSC (2014), processed by author using Statistica.

Table 7 indicates results of composite indicator for rural livelihood.

Table 7 **Outcome of composite indicator – indicators of rural livelihood**

Region	SUMA	RANK	INDEX	Region	SUMA	RANK	INDEX
Anhui	69.40	21	73.02	Jiangxi	77.82	18	81.89
Beijing	225.73	1	237.52	Jilin	118.79	9	125.00
Fujian	93.30	14	98.18	Liaoning	132.69	7	139.62
Gansu	16.40	29	17.26	Ningxia	66.28	22	69.75
Guangdong	97.48	13	102.57	Qinghai	42.48	27	44.70
Guangxi	37.44	28	39.39	Shaanxi	78.55	17	82.65
Guizhou	16.30	30	17.15	Shandong	132.74	6	139.68
Hainan	61.50	23	64.71	Shanghai	212.50	2	223.60
Hebei	124.95	8	131.48	Shanxi	81.62	16	85.88
Heilongjiang	114.48	10	120.47	Sichuan	44.04	26	46.34
Henan	110.44	11	116.21	Tianjin	204.20	3	214.87
Hubei	89.58	15	94.26	Tibet	56.55	24	59.51
Hunan	50.48	25	53.12	Xinjiang	75.55	19	79.50
Chongqing	69.90	20	73.55	Yunnan	11.34	31	11.94
Inner Mongolia	101.14	12	106.43	Zhejiang	173.71	4	182.79
Jiangsu	158.67	5	166.96	**Mean**	95.03		

Source: NBSC (2014), processed by author using MS Excel.

Results of composite indicator calculated from sub-indicators dealing with agricultural development are displayed in table 8.

Table 8 **Outcome of composite indicator – indicators of agricultural development**

Region	SUMA	RANK	INDEX	Region	SUMA	RANK	INDEX
Anhui	211.29	16	108.21	Jiangxi	223.94	15	114.69
Beijing	297.14	4	152.17	Jilin	143.69	20	73.59
Fujian	312.31	3	159.94	Liaoning	178.60	17	91.47
Gansu	59.31	30	30.38	Ningxia	129.29	23	66.21
Guangdong	265.49	9	135.96	Qinghai	102.61	26	52.55
Guangxi	166.79	18	85.42	Shaanxi	139.65	21	71.52
Guizhou	45.33	31	23.22	Shandong	315.31	2	161.48
Hainan	252.86	10	129.49	Shanghai	287.14	6	147.05
Hebei	290.28	5	148.66	Shanxi	96.75	27	49.55

Region	SUMA	RANK	INDEX	Region	SUMA	RANK	INDEX
Heilongjiang	129.06	24	66.09	Sichuan	133.65	22	68.45
Henan	283.00	7	144.93	Tianjin	266.96	8	136.72
Hubei	233.54	13	119.60	Tibet	115.78	25	59.29
Hunan	250.92	12	128.50	Xinjiang	229.39	14	117.48
Chongqing	96.54	28	49.44	Yunnan	80.19	29	41.07
Inner Mongolia	144.73	19	74.12	Zhejiang	251.74	11	128.92
Jiangsu	319.89	1	163.82	**Mean**	195.26		

Source: NBSC (2014), processed by author using MS Excel.

Resulting value of correlation coefficient 0.67 in table 9 proves that between areas of investigation is significant dependence.

Table 9 **Correlation of agriculture development and rural livelihood based on CI**

	Agricultural Development	Rural Livelihood
Agricultural Development	1.000000	0.670219
Rural Livelihood	0.670219	1.000000

Source: NBSC (2014), processed by author using Statistica.

4 Conclusions

From the results of basic statistical characteristics (indicators of rural livelihood) can be observed that the highest value of median and mean have regional GDP per capita. On the contrary the lowest value of both measurements of central tendency show Engel 's coefficient. This indicator has also lowest variance and standard deviation, which tells us that the observations are very similar. In this respect the greatest variance and standard deviation was found for regional GDP per capita and then for per capita income of rural households.

The highest skewness was calculated for per capita consumption expenditure of rural households. Slightly lower value has per capita income of rural households and then regional GDP per capita. For all these indicators apply that they are right skewed and therefore is valid. Opposite result reached Engel 's coefficient, which as the only one have a negative value and thus is marked as left skewed. The same order of indicators of positive and negative values was observed at kurtosis. The first three indicators have peak distribution of data and Engel 's coefficient has flat distribution of data. High values of moment based coefficients for both per

capita consumption expenditure of rural households and per capita income of rural households can be caused by presence of extreme values.

All values of skewness indicate right-sided asymmetry and in particular productivity of rural labor has the greatest value. Gross output value of agriculture per capita has the value closes to zero. Except for second indicator, all values of kurtosis are lower than 0 thus have flat distribution. Only productivity of rural labor indicates peak distribution.

From the results of composite indicator – indicators of rural livelihood is clear, that the best performing provinces are the regions with the highest economic activity, thus Beijing as first and then Shanghai and Tianjin. All these three provinces have the highest regional GDP as well as per capita income and consumption expenditure of rural households. Tianjin has the best performance of Engel 's coefficient which means that people have good living conditions. In these regions, the welfare of rural population is linked to the work of rural residents in the cities. Their income consists mainly of salary instead of their own household business. On the other hand the least favorable situation in the area of rural livelihood can be observed in Yunnan, Guizhou and Gansu. Yunnan is the province with the highest Engel 's coefficient which means that its proportion of rural inhabitant 's income spent on food is the greatest. Such conditions may seem to be the result of the fact that agriculture sector accounts for about 70 % of all rural employed persons. Gansu has the lowest value of per capita in- come of rural households and Guizhou indicates the worst result of regional GDP. Nevertheless it can be assumed that the current situation has improved. From available data is evident that during last four years regional GDP has increased about 50 %.

Composite indicator calculated from sub-indicators dealing with agricultural development are displayed indicates the best situation in the province Jiangsu followed by Shandong and Fujian. The best-rated province has high values at productivity of rural labor, irrigation index and fertilizer investment. Its weakest indicator is power investment. All three best rated provinces are located by the sea and have the greatest output of aquatic products. Shandong and Jiangsu are outside of fishery rich in cereals, potatoes and beans. The worst conditions were found primarily in Guizhou, then in Gansu and Yunnan. Attention should be drawn to the fact that they are the same as those of the previous composite indicator. Guizhou has the lowest productivity of rural labor and Gansu has the smallest proportion of irrigated cultivated land.

Situation in agricultural development can be connected financial flows from big cities and overall economic situation in the provinces. It can also be observed that these countries have the most favorable conditions for cultivation and fish breeding and therefore it is worth to invest in them. However, some data results

are so diverse that there cannot be stated some clear conclusion. It can be evaluated very clearly that the least favorable conditions are in the middle belt of China. It might be a consequence of economic activity of these provinces. Most of them have high value-added into GRP from primary sector which unfortunately cohere with lower standard of living compared to the regions where industry and services prevail. Certain similarities can be observed and therefore visually deduced that among agricultural development and rural livelihood is relationship. Whether the relationship according to results of composite indicators really exists, correlation analysis verified it.

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HIGHER EDUCATION IN THE SERVICE OF THE CAPACITY BUILDING IN HUNGARIAN AGRICULTURAL INNOVATION

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Abstract

Without any doubt, agricultural raw material and food production (and the related branches, e.g. rural tourism, services) are the main fields of economic activities which are able to utilize the resources of the rural areas the most and which need fresh, innovative ideas and initiatives to maintain their economic viability and market competitiveness, as well as to vitalize local communities and keep population in the rural areas, by providing viable livelihood and income.

The Rural Development Policy is built on three overarching objectives, one of which is innovation. The first of six common priorities of the Rural Development Programs is "Fostering knowledge transfer and innovation in agriculture, forestry and rural areas." In this regard, the crucial role of agricultural education is indisputable. Therefore in the Catalyst project (Capacity building in agricultural innovation services in CEE countries), we focus on the promotion of innovation transfer, by combining science-based approach with knowledge resulting from everyday practice and experiences. Eight institutions from six European countries decided to work together to create training curriculum and teaching tools and materials for future innovation advisors. In order to realize the project objectives, thorough understanding of the Hungarian agricultural education system for innovation is needed. During the project work we have prepared interviews with extension-related stakeholders such as farmers, farmer organizations, researchers, research institutes, farm

advisors, consultants, local action groups, technology providers, agricultural VET providers, chamber of agriculture, etc. In this paper not only the agricultural education system is presented but situation analysis of the innovation-related Hungarian agricultural education is summarized based on the results of interviews.

Keywords: *agri-innovation, education, brokering, capacity building*

JEL Classification: *I23, Q16*

1   Introduction

1.1   Current Hungarian higher education in the light of market expectations

In the globalizing world, the role of agriculture is changing. The multi-legacy of the agrarian economy requires new tasks to be solved. Due to the diversification of the agricultural area, areas such as sustainability, environmental protection, rural development, food processing, irrigation, trade, green economy etc. have become important. With the development of science and technology, new challenges emerge in education, and knowledge becomes an increasingly economic factor (Magda et al. 2008). To help students deal with complexity and uncertainty of agriculture, a whole-system approach is essential (Francis et al. 2011). The European Union strives to make its economy the most competitive and knowledge-based in the world. This can only be achieved through innovation, which is not satisfactory in Hungary at regional or corporate level (Marselek et al. 2005).

In Hungary, the quality and popularity of agricultural education has been eroded in the last two decades. The technical and teaching staff has deteriorated, the number of agricultural students has fallen, as well as the skills and knowledge of those who enter the training. The decline in the prestige of agricultural education is partly caused by difficulties in working and partly by low income levels in the sector (Magda et al. 2017).

According to the Hungarian higher education strategy ("Fokozatváltás a felsőoktatásban") and the Hungarian Central Statistical Office (2016), at present, the age structure of people employed by the agricultural sector is unfavourable, their level of education is below from the expected level. (In 2016, 31 per cent of farmers were over the age of 65, while those under the age of 35 were only 5.3 per cent.) It is indispensable to ensure the competitiveness of agricultural enterprises training of professionals with high level of up-to-date knowledge. The needs of enterprises in the field of agricultural commodity production for the graduate agricultural engineers reflect 21st century expectations, which

is a challenge for agrarian higher education. The dual training model between the agricultural and food industry enterprises and higher education institutions is slowly evolving. The importance of agricultural technology is growing, as the validation of "ground to table" principle requires a higher level of information technology, automation and robotization.

As a priority area of higher education, the strategic objectives related to agricultural education are the following: promoting and raising the prestige of livelihoods linked to agriculture; in the medium term, increasing the share of applicants to agrarian higher education to 10% among the total number of applicants; the introduction of new dual forms of training, and – in proportion to rising international demand – the expansion of foreign language programmes; strengthening agrarian education centres, clear assignment of the profile of existing training sites, and the reasonable structural sectoral consolidation of them.

In February 2017, the proposal of the Hungarian State Secretary for Education was published about the development of the national agricultural education and training. The proposal outlined the 'problem map' of the policy area. In conjunction with each other, VET (Vocational Education and Training) and higher education faces content, structure and funding problems, the technological and innovation environment is lagging behind, and, the social and age-based judgment of career paths is negative. The labour market and skilled personnel supply are in danger, the competitiveness of the sector is low. The strategic action plan, sketched in the document, contains the following elements:
– Development of the educational structure and content
– Concentration of the educational and innovation capacities
– Transformation of funding system
– Development of infrastructure
– Development of the background of practical training
– Promotion of agricultural career paths
– Internationalization.

The expected results of the above detailed measures are specified as follows: the proportion of applicants reaches 10% of all applicants, and the number of graduates will increase by 20% until 2020; Hungarian agricultural university will be included among the Top100 agricultural universities within 10 years; the number of foreign students and educators will double; the corporate relationship system is widening and deepening, with viable connection established with the Top20 domestic companies; R&D&I revenues will double by 2020. According to the document, for the successful fulfilment of the objectives – in addition to the cooperation of sectoral actors, the concentration of educational and research

capacities, and the establishment of knowledge centres meeting local, regional and sectoral needs – there is a need for an internationally competitive, comprehensive agrarian university that coordinates research in this field. The other two approaches regarding agricultural higher education are the interdisciplinary universities of science, and the smaller, specialized universities. In the framework of the integration, the agricultural faculties operating in Keszthely, Kaposvár, Kecskemét, Gyöngyös and Nyíregyháza would join to the Gödöllő-Budapest headquarter (currently called Szent István University). At the time this article was written, nothing had been done about the intended integration: not only the actual conversion, but the policy decision itself has yet to be made.

1.2   Structure of agricultural higher education

In Hungary, agricultural higher education is provided by 14 institutions: 11 state (public) universities and 3 state (public) universities of applied sciences. Currently, 28 types of agricultural academic programs are accredited, 12 on bachelor, 18 on master, 3 on undivided master level and 3 in the framework of higher vocational education. 6 academic majors are only represented on bachelor, 12 on master, 3 on undivided master level and 3 in VET (Vocational Education and Training) (the rest are present on multiple levels). In total, there are 54 bachelor, 52 master, 6 undivided master and 16 VET programs launched by the universities.

Table 1 **Number of different agricultural academic programs in the Hungarian higher education by the level of degree**

	BSc	MSc	Undivided master	Higher vocational education
Agricultural Assistant				8
Agricultural Biotechnology		4		
Agricultural Engineering	10		4	
Agricultural Environmental Management Engineering		4		
Agricultural Instruction	1			
Agricultural Water Management Engineering		0		
Animal Husbandry Engineering		5		
Animal Nutrition and Feed Safety Engineering		3		
Crop Production Engineering		2		

	BSc	MSc	Undivided master	Higher vocational education
Equine Husbandry and Equestrian Sport Management	1			
Food engineering	4			
Food Safety and Quality Engineering		4		
Food Science and Technology Engineering		2		
Forestry Engineering			1	
Horticultural Engineering	5	4		
Land Surveying and Land Management Engineering	2			
Landscape Architecture		1		
Landscape Management and Garden Construction Engineering	1			
Master's Degree in Organic Farming		2		
Mechanical Engineering in the Agriculture and Food Industry	6	1		
Nature Conservation Engineering	5	4		
Plant Protection		5		
Rural Development Engineering	10	9		
Stud farming				5
Sustainable Animal Nutrition and Feeding		0		
Veterinary Medicine			1	
Viticulture and Oenology Engineering	4	0		3
Wildlife Management Engineering	5	2		

Source: Own edition, based on Educational Authority (2017).

Figure 1 showcases, how many types of agricultural programs are provided by the different universities, divided into the level of education, but regardless to the educational variant (full-time/part-time) and financing (state-funded/self-financed), because the latter attributes multiply the amount of elements and lead to redundant information (calculations based on the data of Educational Authority 2017).

Figure 1 **Number of types of agricultural programs by the level of degree at the recognised higher education institutions of Hungary in the February and October 2017 admission periods (miscellaneous)**

Source: Own editing, based on Educational Authority (2017).

The highest level of education is the doctorate (PhD or DLA) degree awarded by universities. At present, 7 universities provide 15 PhD programs in the agricultural research fields (Table 2). Doctoral schools with environmental science profile shall not be separated entirely from agricultural sciences as well, and there are many other interdisciplinary connections which blur the boundaries between the different scientific branches and disciplines.

Table 2 **Agricultural doctoral (PhD) schools by research field at the Hungarian universities**

	Animal husbandry	Food sciences	Forestry and wildlife management	Plant breeding and botany	Veterinary sciences
Kaposvár University	Doctoral School of Animal Science				
Széchenyi István University	Wittmann Antal Crop-, Animal- and Food Sciences Multidisciplinary Doctoral School	Wittmann Antal Crop-, Animal- and Food Sciences Multidisciplinary Doctoral School		Wittmann Antal Crop-, Animal- and Food Sciences Multidisciplinary Doctoral School	
Szent István University	Doctoral School of Animal Science	Doctoral School of Food Sciences		Plant Science Doctoral School, Doctoral School of Horticultural Sciences	
University of Debrecen	Doctoral School of Animal Husbandry	Doctoral School of Food Sciences		Kálmán Kerpely Doctoral School	
University of Pannonia	Festetics Doctoral School			Festetics Doctoral School	
University of Veterinary					Doctoral School of Veterinary Science
University of West Hungary			Roth Gyula Doctoral School of Forestry and Wildlife Management Sciences		

Source: Own edition, based on Hungarian Doctoral Council.

In 2013 additional 43 vocational schools were added under the supervision of the Ministry of Agriculture. This act affected 59 schools with 26 000 students. The former National Agricultural Advisory, Education and Rural Development Institute (NAKVI) used to be in charge of the operation, while these institutions acted as independent units. Thereby a unified agrarian vocational training institution system was established. The Ministry of Agriculture strictly defines the content of courses and the examination requirements. (Regulation 56/2016 (VIII.19.) of Minister of Agriculture)

However Székely and Fieldsend (2013) summarize the main deficiencies of the courses in the vocational schools: not practice-oriented, sometimes with inadequate length and content, with numerous and often very specialized topics, and at the same time not including enough training on farm business management. Looking at some private sector adult training organizations, in spite of the compulsory registration, they do not meet the standards. The trainees are either students (with or without future farming ambitions), or farmers and forest holders attending the courses because they are subsidized.

Under the Ministry of Human Capacities, education of advisory is carried out in 10 universities, in the framework of different Bachelor, Master and postgraduate programs, training courses, modules and subjects (Figure 2).

Figure 2 **Universities providing agricultural advisory education in Hungary**

Source: Own editing based on Ministry of Agriculture, 2017.

At most universities courses on advisory services are optional or obligatory (mainly in some master programs' curriculum).

It should be emphasized that the universities are the locations and provide the knowledge base of the seven Regional Advisory Centers of the Farm Advisory System and of several of the Territorial Advisory Centers after the integration of the agricultural colleges into the universities.

2   Data and Methods

One of the aims of the CATAlyst project was to create a situation analysis of agricultural innovation services in Europe, for that reason a complex questionnaire was complied. The structured interviews followed three topics: Innovation and trainings; Innovation capacity and Innovation and partnerships. The methods of interviewing were live interview (in person, group discussion) and phone interviews with variable duration from 35 to 150 minutes.

Within the 'Innovation and trainings' section of the interview – which focused on agro-innovation process and possibilities - we discussed the situation of Hungarian agricultural secondary education, higher education and vocational trainings with two farmers, two researchers, two research institutes, three consultants, one agricultural VET provider, two local action groups, one input provider, one applied researcher, product developer/technology and product provider company, and one representative of the Chamber of Agriculture. According to the answers weaknesses and strengths of agricultural education can be identified.

3   Results and Discussion

3.1   Situation analysis of the Hungarian agricultural education system

On Table 3, the consensual strengths and weaknesses of the Hungarian agricultural education system is summarized.

Table 3 **Weaknesses and strengths of the Hungarian agricultural education system**

WEAKNESSES	STRENGTHS
Secondary education	**Secondary education**
Students with weak capabilities (no general skills)	State program for demonstrational farms
	Modern educational infrastructure (but this potential is
No rural development education	not fully exploited.)
Underpaid, demotivated teachers	Provision of practical knowledge for farmer students

WEAKNESSES	STRENGTHS
Higher education Decreasing number of students (low prestige) Decline in quality No practical education (disfunctional Bologna system) Too theoretical, and do not give enough confidence and creativity R&D money devoured by wages and utilities	**Higher education** Theoretical education provides deep insight High number of scholarships Postgraduate programs
Vocational trainings Trainings commercialized Some VET centres privileged on political basis	**Vocational trainings** Practical courses are popular Agricultural trainings are available countrywide Significant number of good examples exist: - NAK Nonprofit Ltd. (which is the private organisation of the Hungarian Chamber of Agriculture) provides quality education with practitioner-teachers - HCA 80 hours plant protection – pest management course (which is mandatory for purchasing pesticide, because of the 43/2010 Ministry of Agriculture act on plant - protection that declares the need for the so-called 'Green Paper'. The vocational schools can provide 'group advisory' through HCA. National programs for Local Action Groups

Source: own editing based on stakeholder interviews, 2017.

4   Conclusion

A wide range of programs is provided by the institutions of agricultural education in Hungary, covering all the professional fields related to agriculture. However, neither the secondary nor the higher education fulfils its potential, and both are suffering from the decreasing number of students and the decline in quality. Agricultural higher education is facing several challenges which hinder its international competitiveness and reduce the innovation capacity of the sector. Policy makers' response to the arising problems is outlined in different general and specific strategic documents and proposals, but concrete actions just barely have taken place in the recent years.

Upcoming reorganization of the agricultural higher education is expected which presumably will be partially based on the concentration of education and innovation capacities.

The market of VET programs is diverse, and often steeped in politics. According to the interviewed stakeholders, the discovered weaknesses of agricultural education system directly affect the farmer society's receptivity and ability for innovation in an unfavorable way.

However, there are certain initiatives (private and/or state supported) that intent to aim at enhancing the prestige of the agricultural sector. The 'agrarian specialist of the year' event shows the excellence of the agricultural profession in many categories, which makes the profession attractive to young people as well. Salaries of those who have agricultural degree (BSc/MSc) working in agricultural administration are quite high compared to the average Hungarian earnings that also makes agricultural studies attractive. Stakeholders' opinions, however, suggest that competence-based learning should not only be supported by the preparation of specific competence tables, but should thoroughly distinguishes the practice-oriented BSc and the more theoretical MSc studies. Practical education should focus on the application of experimental learning as visualization and experiments are the best methods to provide students with practical knowledge. Besides theoretical classes, living examples have to get a higher importance in educational structure in general but more pronouncedly in BSc level courses. For this purpose, the development of trial farms is essential, so BSc students would be able to find a job in production right after graduation.

Although the range of MSc trainings covers all areas of expertise (there are 18 master programmes to choose from), but training curricula lack the subjects that would develop soft competences. According to stakeholders' opinion, these soft competencies besides theoretical knowledge would assist to strengthening the generation of innovation in agriculture. However, this change in education would require trainings for teachers and also a complete change of teaching approach.

The greatest potential for reforming teaching methods lies in the VET system, as there are already existing good-practices. It would be advisable to incorporate some elements of these good-practices into the higher education as well in order to boost capacity building in the Hungarian agricultural innovation.

Acknowledgements

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SESSION 12

AGRICULTURAL MARKETS AND INSTITUTIONS – ORGANISED SESSION BY THE ASSOCIATION OF AGRICULTURAL ECONOMISTS IN SLOVAKIA – AAES

ANALYSIS OF COCOA PRODUCTION AND EXPORT IN GHANA

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Abstract

The objective of this paper is to analyse the production and export of Cocoa in Ghana. Concerns about declining output and export of cocoa in Ghana has prompted the necessity of this study. Given the significance of Ghana as the principal producer and exporter of cocoa and a major source of foreign earnings in the country, it is imperative to analyze the production and export trend of the industry. This study review cocoa production and export in Ghana over a 21 year period spanning from 1995 to 2016. Time series data were employed and these were collected from FOA database and other secondary sources from Literatures and books to process the data. We assessed the country's production and export trend by using both empirical and descriptive approaches which were checked by multivariate statistical analysis. The results suggest that total cocoa production and export in Ghana both witnessed an average year-over- year increase of 5.3% and 5.7% respectively.In spite of these improvements observed, there is potential for further improvement and this can be achieved throughgovernment support to the subsector.

Keywords: *Ghana, Cocoa, Production, Export, Output*

JEL classification: *C10, Q13*

1   Introduction

Cocoa is the main stay of Ghana formal economy. It accounts for 30% of the total export earnings and provides income for about six million people (Anthonio and Aikins, 2009; Gockowski et al., 2011; USDA, 2012). Ghana also plays an important role on the international cocoa market being the second largest producer of cocoa beans in the world after Ivory Coast and representing about 20% of

global production (ICCO annual reports). As in most cocoa-producing countries, Ghanaian cocoa is grown by small-holder farmers. The sector employs about 2 million people who are engaged in farming, trade, transportation and processing of cocoa (World Bank, 2011) and provides

In view of the significance of cocoa as a principal export crop and a major source of foreign earnings in Ghana, it is imperative to analyze what the production and export of the industry brings to national development.

Some researchers have attempted to investigate the production and export of Cocoa, Boansi (2013) examined cocoa production in the producing areas and came out with results that revealed a significantly positive relation between current cocoa exports and production. Arguably, increases in exports of cocoa beans stimulate farmers to increase production in the country.

Ndubuto et al. (2010) confirm that cocoa output has a positive influence on export in Nigeria. Daramola (2011) finds a robust positive relationship between world prices and cocoa export in Nigeria and concluded that an inverse relationship exists between farm gate price (producer price) and cocoa exports, as well as between exchange rate and export in the country. Arguably, an increase in producer price is likely to discourage producers from exporting their products. Amoro and Shen (2013) confirm a positive relationship between production and export performance in Cote D'Ivoire.

A study by Rosdi (1991) investigated the main factors that determine the cocoa prices; his model consists of supply, demand and price equations, with stock as the identity. His results show that domestic cocoa prices are determined by prices prevailing in the world market. Domestic stock change is not significant. The world market itself, stock and consumption are the main factors that influence the behaviour of cocoa prices. World consumption and export demand are significantly influenced by the production index of the industrial nations and price of cocoa. On the supply side, cocoa production is determined by cocoa price lagged by the gestation period. This implies that investment decision on cocoa three to five years earlier is an important factor that determines cocoa supply.

This study seeks to analyze the production and export of Ghana's cocoa and to examine the trend over time.

2 Data and Methodology

Secondary data, such as books, article journals and annual statistical data from various institutions were used. Annual time series data between1995 and 2016 were obtained from Comtrade United Nations and the Food and Agriculture Organization (FAO) of the United Nations. The study attempts to analyze the level of

production and export of both raw and processed cocoa products in Ghana using empirical analysis of the years under review to determine the rate of growth of the cocoa sector. This method was checked through descriptive statistics analysis.

3 Results and Discussion

3.1 Cocoa Production and Export:

Figure 1 shows the trend of annual cocoa production and export in the world measured in tonnes and the share of cocoa production and export from Ghana as a percentage of world production and export between 1995 and 2016. As presented in figure 1, annual cocoa bean output in the world has drastically increased from 2.9 million tonnes in 1995 to 4.4 million tonnes in 2016. In the same direction, the annual world cocoa export has also steadily increased from 1.8 million metric tonnes in 1995 to 2.7 million metric tonnes in 2016. Ghana is the second largest cocoa producer and exporter in the world after Ivory Coast. Cocoa bean production in Ghana has been fluctuating in the years under study. The Country has recorded negative growth rates in some years. For instance, the country recorded worst annual change in 1997 (-20%) and highest positive growth rate in 2004 (48%). More so, as shown in figure 1, the annual production of cocoa in Ghana has increased by 112%, from 404 thousand metric tons in 1995 to 859 thousand metric tons in 2016, representing an average year-over-year production increase of 5.3%.

This increment could partly attribute according to Asante-Poku and Angelucci (2013) to the support measures of the government-owned cocoa marketing board COCOBOD. These include increases in farm gate prices, introduction of free pest and disease control programmes, the introduction of packages of hybrid seeds, fertilizers, insecticides and fungicides, improved marketing facilities and the repair of roads in cocoa growing areas. An important factor is also the expansion of the cocoa growing area. Arguably, Ghana is a major supplier of the cocoa crop in the world. Figure 1 shows that Ghana recorded over 75% average annual cocoa export as a percentage of domestic cocoa bean output.

Figure 1 **World and Ghana Cocoa production and exports (in tonnes and %), 1995-2016**

The major cocoa export destinations are Western Europe and North America where cocoa processing industries are located. However, as shown in the figure 1, Ghana's cocoa export as a percentage of world export has fluctuated and decreased from 13% in 1995 to 10.9 % in 1997 and 10.4% in 2010 and drastically increased to 19.31% in 2013. Arguably, cocoa export was not given the expected attention by the Ghanaian government. Figure 1 also shows the export as a percentage of cocoa production in Ghana, in some years, export as a percentage of domestic production was around 59% in 1995 and more than 100% in 1996. This issue is likely from the data collection; export or output was either under-reported or over-reported. Another reason for these differences could be because, the quantity produced in the previous year is likely to be exported in another year. Cocoa is the largest agricultural export commodity in Ghana. The country's cocoa exports even though fluctuating; it has steadily increased from 239 thousand tonnes to 526 thousand tonnes between 1995 and 2013. This represents an annual export increase by 120%, and an average year-over-year export increase of 5.7%. The fluctuation of the quantity of cocoa export in the country could be attributed to the world price, domestic production and supply for export, neglect of cocoa related activities by the government, partners and farmers, etc. For instance, both farm gate and the world price over the years were also far from consistent.

3.2   Cocoa Export and Value Addition

Cocoa exports from Ghana are made up of five products, classified into: raw, semi-processed and processed products. Ghana exports cocoa beans, cocoa butter, cocoa powder, cocoa paste and cocoa husks (shells), with export of the latter commencing in the year 1986. In spite of efforts by the government to increase value added in its export of cocoa, less that 20% of cocoa exports for the period 1995-2013 were processed. This implies that, at least 80% of all cocoa exports of the country are in the raw form. The highest achievement in value addition by quantity so far was in the year 1996, where 33, 496 of all cocoa exports were processed (see figure 2).

Figure 2 **Value addition in cocoa exports from Ghana**

Export of cocoa butter increased from 33, 496 tonnes for the year 1996 to 39054 tonnes in 2011. Likewise, the volume of export for cocoa paste increased from 8757 tonnes in 1995 to 26044 tonnes in 2007 and later decreased to drastically to 100 tonnes in 2013. Exports of cocoa powder decreased from 2190 tonnes for the year 1995 to 226 tonnes in 2013. Variations are however observed in quoting of these figures due to differences in export volumes reported by the various research, data management and processing bodies. Based on figures from the agricultural production database of the FAO (FAOSTAT), and as shown above.

3.3   Cocoa Supply Chain of Ghana

The cocoa supply chain of Ghana is characterized by a unique marketing arrangement that combines elements of privatization with a strong government presence. The entire supply chain is made up of input suppliers, farmers, collectors/cooperatives, Licensed Buying Companies (LBCs) (and their clerks who engage in purchases at cocoa buying centres), Haulers, Cocoa Marketing Company (CMC) (the

wholly-owned subsidiary of the COCOBOD with the sole responsibility to market and export cocoa beans to local and foreign buyers), local processors, local retailers, global marketers/manufacturers and international and local consumers. Activities on the domestic side in the entire chain are supervised by the Ghana Cocoa Board (COCOBOD). In holding firmly unto its high standards in terms of quality of cocoa beans export, the Quality Control Division of Ghana under the auspices of the COCOBOD oversees quality control measures at all stages of the supply chain. Supply of inputs in Ghana is mostly in the hands of the private sector. In line with its strategy to raise productivity and output, the Government of Ghana (GoG), through COCOBOD retains an active role through subsidized input distribution programs targeting cocoa farmers, although farmers bear majority of the cost (World Bank, 2011). The input needs of farmers are met by suppliers through marketing of agrochemicals (including fertilizers, pesticides, and insecticides) and farm equipment. The primary role of farmers in the chain is to ensure availability of cocoa beans through a year-round production. Cocoa production in the country is dominated by smallholder farmers who cultivate on smallholdings with an average size of two to three hectares. About a quarter of production is on a share-cropping basis (Hainmueller et al., 2011). After harvesting of cocoa, the beans are dried and fermented to help develop the unique flavor and other attributes that attract premium for Ghana cocoa beans on the world market. Once all the necessary post-harvest treatments have been performed, the beans are sold through either individual collectors or producer cooperatives to cocoa buying centres established in major cocoa producing areas. Such centers are occupied by purchasing clerks of the Licensed Buying Companies. The beans are purchased from the farmers at minimum price set by a Producer Price Review Committee (PPRC) which comprises of COCOBOD officials, farmers' representative, government representatives and representatives of the Licensed Buying Companies (LBCs). By this, the revenues of the LBCs are not based on prices differentials, but rather on volumes of cocoa marketed. Under this condition, LBC's maximize their profits by minimizing "turnaround" times (thus, the period from purchase of the beans at farm gate to selling of them at the takeover centers). After purchasing the cocoa, the LBCs invite the Quality Control Division to grade and seal the cocoa at a fee determined by the PPRC. The graded and sealed cocoa is then evacuated by the LBCs using private cocoa haulers to designated take over points at Tema, Takoradi and an inland port at Kaase (in Kumasi). The rates offered for evacuation are determined by the PPRC, and so are the LBCs paid by the COCOBOD according to margins set by the PPRC. On reaching the take-over points, the graded and sealed cocoa is taken over by officials of the Cocoa Marketing Company. The Cocoa Marketing Company (Ghana) Limited (CMC) is a wholly-owned

subsidiary of the Ghana Cocoa Board and has the sole responsibility for the sale and export of Ghana cocoa beans. Its major responsibilities include procurement of graded and sealed cocoa beans from the LBCs at the take-over points, stocking of cocoa prior to shipment, securing optimal prices and maximizing foreign exchange revenues, managing sales and collecting receipts, and settling of any disputes via direct arbitration (World Bank, 2011). After the take-over, management of cocoa becomes the responsibility of the CMC until it is shipped overseas. Prior to shipment however, the Quality Control Division inspects and fumigates all shipping vessels and cocoa consignments. A greater share of purchased cocoa beans is exported in the raw form. The smaller sized (light crop) beans are sold to processing industries in the country at a discount. Light crop beans are smaller in volume than the main crop variety exported in the raw form, although the quality of the bean is the same. About 90% of all processed cocoa is exported while the remaining 10% is used in the production of confectionery products (Ashitey, 2012). Exports of the domestically processed cocoa products to overseas destinations are as well done by the CMC. The processed products that are not exported are sold to domestic consumers, and some of the processed products on the international market find their way back into the country. Such imports attract a tariff of 20%.

3.4   Global Exports and Imports of Cocoa from Ghana

With global exports of cocoa having increased in recent years from 1919079 tonnes in the year 1995 to 2943227 tonnes in 2013, the role of Africa in global exports of cocoa cannot be overstated. Exports from Africa accounted for approximately 68% of world cocoa exports between the years 1995 and 2013, with the Americas accounting for 6.6%, and Asia and Oceania 13%. Most of the global exports of cocoa however are recorded in the names of three main countries, namely; Côte d'Ivoire, Ghana, and Indonesia. These three countries accounted for 64% of cocoa exports between the years 1995 and 2013. Individually, exports from Côte d'Ivoire represent 36.1% of global exports, Ghana 16.1%, Indonesia 11.8%. As displayed in Fig 3, together with some selected ICCO member countries like Ecuador and Papua New Guinea, these countries accounted for approximately 68.82% of net global cocoa exports during the period 1995-2013

Figure 3 **Net Export of cocoa**

On the import side, as shown in Figure 4, Most of the imports of cocoa from Ghana however were into the European Union, the United States and Asia. A sample of fifteen highest importing countries was chosen for this study survey between 2006 and 2016. Total import of cocoa of the fifteen countries from 2006 to 2016 accounted for 7832729 metric tonnes. The United States accounted for 7.3%, Belgium 6.8%, France 8.6%, Brazil 1.9%, Japan 5.1%, Germany 6.6%, Netherlands 25%, Turkey 5.1%, Malaysia 8.95%, Switzerland 3.1%, United Kingdom 10.1%, Spain 3.7%, Russia 3.2%, Canada 1.1% and China 3.3%. Total imports of cocoa of the fifteen countries increased from 634127 tonnes in the year 2006 to 745344 tonnes in the year 2016. This represents 17.5% increase in cocoa import.

Figure 4 **Net import of cocoa from Ghana by country from 2006-2016**

4   Conclusion

The study revealed that cocoa production, aggregate exports of cocoa beans and processed cocoa witnessed an increase in the years under review. Annual

production of cocoa in Ghana increased by 112%, from 404 thousand metric tons in 1995 to 859 thousand metric tons in 2016, representing an average year-over-year production increase of 5.3%. The country's cocoa exports even though fluctuating; it steadily increased from 239 thousand tonnes to 526 thousand tonnes between 1995 and 2013. This represents an annual export increase by 120%, and an average year-over-year export increase of 5.7%. This improvement has been attributed to government support in the cocoa subsector in Ghana.

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COMPARATIVE ADVANTAGES OF THE UNITED KINGDOM'S AGRI-FOOD TRADE IN RELATION TO THE EU

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Abstract

The United Kingdom as a member of the EU can enjoy full access to the Single European Market. In terms of agri-food trade, the EU is UK's most important trading partner. However, in June 2016, the UK opted to leave EU. This decision will significantly influence the whole economy of the UK including agri-food trade. Therefore, the objective of this paper is to examine development and comparative advantages of The United Kingdom's agri-food trade with respect to the EU-27 markets. The analysis is based on Balassa index and its stability over the period. Agri-food trade data used in paper are classified according to the Harmonised System (HS). The data were acquired from Eurostat Comext database and cover the period 2000-2016. An analysis showed that over the period, the UK was able to retain comparative advantages only in three categories – HS 03 Fish, HS 21 Miscellaneous edible preparations, HS 22 Beverages, spirits and vinegar. In the rest of agri-food commodities the declining trend can be observed and in 2016 the UK had comparative disadvantages in 21 agri-food commodities. Based on the results of regression analysis focused on the stability of distribution of Balassa indices over time, we can conclude that the degree of specialization in the agri-food trade between the United Kingdom and the rest of the EU has been decreasing as the number of commodity groups with a comparative advantage has been declining. With respect to Brexit, the agrarian trade of the UK deserves special attention, because the potential increases in trade costs are expected to affect the UK proportionally more than the EU27.

Keywords: *agri-food trade, Balassa index, comparative advantage, the United Kingdom*

JEL classification: *F10, F14, Q17*

1   Introduction

International trade continues to be of great importance to the United Kingdom's agri-food sector. Because the UK is a relatively small economy, it needs access to both export and import markets to realize an efficient scale of production and to acquire many of the inputs used by UK producers (ONS, 2016). Geographical location as well as economic size make Europe the UK's natural trading partner. The importance of geographic factors, such as the distance between countries is one of the most important empirical facts for international trade flows (Anderson, 2011). In 1993, EU launched the single market – the internal market of the European Union, which enables the free movement of goods, services, capital and persons. The EU's single market also involves three tools to boost trade. First, it eliminates tariffs on goods. Second, it provides companies and people with right to sell their goods, services or labour, or to invest, in other member-states. Third, by creation minimum regulatory standards, it reduces the cost of potential exporters having to comply with different national rules of 28 member states (Springford & Tilford, 2014). These tools have made the trade including trade with agri-food products between EU member states easier. However, in June 2016, The United Kingdom decided to leave EU. Despite the fact that the form of the future trade relationship between the UK and EU is subject of ongoing talks and negotiations, it is clear that Brexit will mean the worse conditions of trading relationship than as in case of being a member of EU, especially if the UK will leave single market. Brexit may negatively influence agri-food trade of UK as well, although agri-food products are less traded than manufactured ones, they will be however subject to the largest increases in trade protection, both in terms of tariffs and non-tariff measures (Bellora et al., 2017). This means, that Brexit may hurt the competitiveness of UK on markets of EU.

2   Data and methodology

The economic literature deals with three different levels of competitiveness: at national level, at industry level and at firm level (Bojnec & Fertö, 2006). The competitiveness at national level relates to trade and there are various approaches aimed for its evaluation. One way is to analyze it through a concept of comparative advantages. The theory of comparative advantages assumes that international trade between nations occurs due to differences in the relative opportunity costs. This theory says that countries are competitive in goods and services in which they have a relative cost advantage (Nallari & Griffith, 2011). This paper analyzes the development of agri-food trade of UK and revealed comparative advantages of

the UK's agri-food commodities with respect to the EU-27 countries. To conduct the empirical analysis we gathered trade data from Eurostat Comext database. Analysed time series covers the period 2000-2016. Agri-food commodities are classified according to the Harmonised System (HS) into 24 different 2-digit sections (Table 1).

Table 1 **Commodity structure of agri-food trade**

HS	Commodity
01	Live animals
02	Meat and edible meat offal
03	Fish and crustaceans, molluscs and other aquatic invertebrates
04	Dairy produce; birds' eggs; natural honey
05	Products of animal origin, not elsewhere specified or included
06	Live trees and other plants
07	Edible vegetables and certain roots and tubers
08	Edible fruit and nuts
09	Coffee, tea, mate and spices
10	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten
12	Oil seeds and oleaginous fruits
13	Lac; gums, resins and other vegetable saps and extracts
14	Vegetable plaiting materials
15	Animal or vegetable fats and oils and their cleavage products
16	Preparations of meat, of fish or of crustaceans and others.
17	Sugars and sugar confectionery
18	Cocoa and cocoa preparations
19	Preparations of cereals
20	Preparations of vegetables, fruit, etc.
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
23	Residues and waste, prepared animal fodder
24	Tobacco and manufactured tobacco substitutes

Source: Eurostat Comtrade database.

The concept of comparative advantage is the main methodological approach applied for investigation of agri-food trade data. The idea to determine a country's strong sectors by analyzing the actual export flows was pioneered by Liesner (1958), who first introduced the concept of revealed comparative advantage. Later Balassa (1965) modified this method and therefore it is also known as Balassa index. He defined it as follows:

$$B = (X_{ij} / X_{it}) / (X_{nj} / X_{nt}) \quad (1)$$

where X represents exports, i is a country, j is a commodity, t is a set of commodities, and n is a set of countries. The B index is based on observed trade patterns. It measures a country's exports of a commodity relative to its total exports and to the corresponding export performance of a set of countries (Utkulu & Seymen, 2004).

In our case Xij describes British exports for a particular agri-food product group to the EU-27 countries, while Xit is total agri-food exports of UK to EU-27. Xnj denotes the EU-27's exports for a given agri-food product group and Xnt total merchandise exports by EU-27 countries, which are used as the benchmark of comparison. We considered only intra-EU trade flows as the analysis is focused on evaluation of relative competitive performance of the UK in the EU market, no consideration was given to the position of extra European countries in the EU market or to extra-EU trade.

If $B > 1$, then a comparative advantage is revealed, i.e. a sector in which the country is relatively more specialized in terms of exports. So it reveals higher competitiveness. Values between zero and one indicate comparative disadvantages (Bojnec & Fertö, 2007).

Balassa index is often criticized because it is seen to neglect different effects of agricultural policies and exhibits asymmetric values. Trade structure is distorted by different state interventions and trade limitations, while the asymmetric value of the B index reveals that it extends from one to infinity if a country enjoys comparative advantage from a product, but in case of comparative disadvantage, it varies between zero and one, which overestimates a sector's relative weight (Jambor, 2013). Moreover, Balassa index does not account for import trade flows. Despite these drawbacks, it still stands as the most widely used revealed comparative advantage index. The main benefit of this index against its alternative trade indices is its theoretical foundation that changes in the B index are consistent with changes in countries' relative factor-endowments (Hinloopen & van Marrewijk, 2008; Bojnec & Fertő, 2008). The B index can provide useful evidence on the country's agri-food export competitiveness on global markets.

In literature numerous studies have used the Balassa index or its modifications with aim to identify a country's strong sectors. For example, by evaluating three

indices - export market share (EMS), revealed comparative advantage (RCA) and net export index (NEI), Banterle (2005) analysed the competitive performance of the EU countries for food trade in the European market during the period 1990-2003. Bojnec & Fertő (2015) investigated the competitiveness of agri-food exports of the EU-27 countries on global markets, using the Balassa index over the period 2000-2011. They found that a majority of agri-food products in the EU-27 countries show a comparative disadvantage on global markets. Carraresi & Banterle (2008) measured competitiveness of food industry and agriculture in the EU market over the 1991-2006 period, using trade index RCA (Balassa index) as well as other indices (EMS, RXA, RMA, NEI). The results were concluded by cluster analysis dividing countries with similar trends into three groups. The United Kingdom was included in third group which represented countries with worst performance, meaning that these countries had decreasing indices and showed loss of competitiveness.

Indices of RCA are arguably useful as one of the few formal ways of measuring the sector identity and intensity of a country's comparative advantage and disadvantage (Richardson & Zhang, 2001). However, when using the RCA index, there is often question about the stability of this index and perseverance of agri-food trade composition across time. According to Hinloopen & van Marrewijk (2001) there are distinguished at least two types of stability. One is the stability of distribution of the indices from one period to the next, second is the stability of the value of the indices for particular product groups from one period to the next. We decided to examine first type of stability. According to the approach applied by Dalum et al. (1998) we run the regression analysis, where we used Balassa index:

$$B_{ij}^{t2} = \alpha_i + \beta_i B_{ij}^{t1} + \varepsilon_{ij} \ (2)$$

$t1$ and $t2$ describe the start year and the end year, respectively. The value of Balassa index B in year $t2$ for sector i in country j, represents the dependent variable. The independent variable is represented by value of Balassa index B in start year $t1$. α and β are parameters of linear regression, ε is a residual error. If $\beta = 1$, then it means an unchanged pattern of B between periods $t1$ and $t2$. In case that $\beta > 1$, the existing specialization of the country is strengthened. If $0 < \beta < 1$, then initial patterns have changed. Sectors with initially low B indices grow over time, while sectors with initially high B indices declined. In situation when $\beta < 0$, it is indication of a change in the sign of the index. But Dalum et al. (1998) argues that when $\beta > 1$, it is not a necessary condition for growth in the overall specialization pattern. The degree of change also depends on R^2. According to Cantwell (1989) it is expressed as follows:

$$\frac{\sigma_j^{t2}}{\sigma_i^{ti}} = \frac{|\beta j|}{|Rj|} \ (3)$$

where σ refers to standard deviation of dependent variable and R is the coefficient of correlation from the regression. In case $\beta > R$ (or $\beta/R > 1$), the standard deviation has increased over time, thus the degree of specialization has increased, while if $\beta < R$ (or $\beta/R < 1$), the degree of specialization has decreased.

3   Results and discussion

Before analysing the magnitude of Balassa index (RCA), it is good to gain the broad picture of agri-food trade. Therefore we take a look at real development of trade flows of the United Kingdom with EU (in nominal terms). Looking more closely at agri-food trade data of the UK, we can see that the value of total UK agri-food imports from EU and from the rest of the world in 2016 across the 24 chapters of HS2 was 55,7 billion EUR, while the value of UK total agri-food exports reached 25,4 billion Eur. Overall, this suggests that the UK is a net importer of agri-food products, which is also reflected in a total agri-food trade deficit of 30,3 billion EUR in 2016. Both British agri-food imports as well as exports are dominated by trade with the EU. The relationship between the UK and the EU-27 is characterized by a strong dissymmetry. The EU-27, as a whole, is a large market (population more than 445 million people and a GDP of USD 13,8 thousand billion in 2016), while the UK is relatively smaller (a population of 65,6 million people and a GDP of USD 2,6 thousand billion). Thus, the EU-27 represents a large market and outlet for UK exporters. The UK is, in comparison, a small market for EU-27 (even if it represents the main export destination of some agri-food sectors in given EU-27 countries). Despite this, the UK is currently the second largest EU country and in terms of trade is closely integrated with the EU-27.

Figure 1 presents the development of UK's exports and imports in the EU-27 markets during the period 2000-2016. In 2016 British imports of agri-food products from EU member states were 39,5 billion EUR which is almost 71 % of the whole British agri-food imports. The value of UK's agri-food exports to EU in that year reached 15,85 billion EUR (62,4 % of the whole UK's export). Compared to level of exports and imports of UK with EU sixteen years ago (2000), the value of both exports and imports with EU has significantly increased. Agri-food imports from EU in 2000 represented 19,37 billion EUR, in 2016 this value was by 103,86 % higher. Agri-food exports of UK to EU over same period increased as well, although less than import. Compared to value 10,3 billion EUR in 2000, exports in 2016 were higher by 53,87 %.

Figure 1 **Agri-food trade of the UK with EU (in billion EUR)**

Source: Own calculation, based on data from Eurostat Comext.

If we look more closely at commodity structure of UK's trade with the rest of EU (according to the international tariff nomenclature for the classification of product HS2), we can see that over the monitored years the category HS 22 Beverages, spirits and vinegar represents the largest component of both UK agri-food exports and imports. In last 10 years, beverages and spirits comprised around 14 % of the total agri-food import from EU-27 and around 20 % of export to EU-27. The second major exported agri-food commodity in 2016 was represented by category HS 21 Miscellaneous edible preparations with export value 1,66 billion EUR. HS 02 Meat and edible meat offal with export value 1,35 billion EUR was the third most exported agri-food commodity in 2016 and the category HS 03 Fish with export value 1,31 billion EUR has the fourth position in exports to EU.

The import side of commodity structure in 2016 is very similar to that of export. The value of import of beverages in 2016 reached 5,54 billion EUR and makes it the most imported commodity. During the sixteen years the second most imported agri-food commodity has not changed and this position belongs to meat. In 2016 the value of meat imports reached 4,21 billion EUR. The other major imported agri-food commodities have been changing over the years. In 2016, preparations of cereals held the third position with imports value 3,31 billion EUR and dairy produce holds the fourth position with imports value 3,04 billion EUR.

Table 1 presents the results of RCA index for 24 categories of agri-food commodities of the United Kingdom in period 2000-2016. Results reveal there are

only three categories in which the UK was able to retain a comparative advantage during the whole sixteen years period. It is category HS 03 Fish, HS 21 Miscellaneous edible preparations and HS 22 Beverages. As seen earlier in this paper, the category of beverages is the major exported agri-food commodity of the UK accounting for 21 % of the whole agri-food export to EU-27 in 2016. The category HS 21 Miscellaneous edible preparations was the second and category HS 03 Fish was fourth most exported agri-food commodity accounting for 10 % and 8 % of the whole agri-food export to EU-27 in 2016, respectively. For this reason, the UK seems to be trading in the right way, since it is exploiting these comparative advantages well with regards to EU. However, the RCA index in category of fish is deteriorating. Categories miscellaneous edible preparations and beverages showed gradual decline from 2000, but from 2009 the RCA index started increasing until 2015. In 2016 we can observe decline in both categories. Other agri-food categories which used to have a comparative advantage experienced the decrease and in many cases the UK lost comparative advantage on EU-27 market. It means that revealed comparative advantage was not persistent. We can see that from 2000 to 2012, the UK had a comparative advantage in category HS 19 Preparations of cereals, but from 2012 this RCA index has significantly decreased and the UK lost comparative advantage in this category. The UK used to have a comparative advantage in EU-27 markets in two more categories – HS 09 Coffee, tea, mate and spices and HS 24 Tobacco and manufactured tobacco substitutes, however over time it lost comparative advantage in these categories as well. Especially the category of tobacco experienced a sharp decline. In 2000, the RCA index reached value 1,94 indicating comparative advantage and in 2016 the value of RCA was at very low level 0,24, which means that UK has a comparative disadvantage in this category. In most agri-food categories, the RCA index reaches values lower than 1. The low values imply comparative disadvantage ant therefore these commodities comprise very low share on the export of UK to EU-27. Over the monitored period the UK reaches lowest RCA index in category Live trees and other plants (0,09-0,12) as well as in category Edible fruits and nuts (0,11-0,20).

Table 1 **Development of the Balassa index for agri-food commodities: The UK - EU-27**

HS/year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
01	0,97	1,09	0,80	1,05	0,87	0,81	0,77	1,01	0,76	0,65	0,61	0,62	0,51	0,53	0,63	0,82	0,75
02	0,71	0,40	0,54	0,54	0,55	0,55	0,54	0,53	0,59	0,60	0,67	0,71	0,66	0,66	0,66	0,64	0,60
03	1,66	1,68	1,70	1,75	1,70	1,66	1,50	1,44	1,30	1,34	1,38	1,29	1,25	1,13	1,15	1,07	1,07
04	0,65	0,57	0,62	0,64	0,65	0,57	0,61	0,57	0,47	0,49	0,52	0,58	0,56	0,56	0,60	0,60	0,55
05	0,75	0,68	0,72	0,76	0,84	0,84	0,72	0,70	0,68	0,70	0,77	0,83	1,03	0,84	0,91	0,90	0,70
06	0,11	0,11	0,11	0,11	0,11	0,12	0,12	0,12	0,11	0,11	0,09	0,11	0,09	0,11	0,10	0,11	0,10
07	0,30	0,27	0,30	0,30	0,30	0,28	0,27	0,24	0,23	0,25	0,24	0,24	0,22	0,21	0,20	0,22	0,22
08	0,13	0,12	0,12	0,11	0,15	0,16	0,20	0,16	0,14	0,15	0,17	0,17	0,15	0,17	0,14	0,15	0,15
09	1,05	1,41	1,38	1,17	1,01	0,69	0,75	0,66	0,59	0,69	0,74	0,55	0,52	0,69	0,67	0,65	0,66
10	1,37	0,70	0,81	1,38	1,05	0,96	0,88	0,78	0,81	0,77	0,97	0,76	0,49	0,31	0,48	0,68	0,83
11	1,08	1,05	1,01	0,81	0,82	0,80	0,72	0,64	0,73	0,78	0,83	0,79	0,85	0,82	0,73	0,76	0,75
12	0,35	0,28	0,52	0,51	0,36	0,43	0,47	0,52	0,43	0,28	0,45	0,83	1,14	0,63	0,63	0,53	0,47
13	0,64	0,57	0,82	0,82	0,90	0,96	1,14	0,96	1,60	1,03	0,98	0,95	1,06	0,88	0,77	0,94	0,87
14	0,19	0,13	0,23	0,25	0,27	0,26	0,34	0,49	0,39	0,29	0,34	0,50	1,37	0,85	0,38	0,37	0,63
15	0,62	0,61	0,83	0,96	0,71	0,66	0,69	0,68	0,49	0,60	0,62	0,46	0,51	0,50	0,55	0,52	0,43
16	0,67	0,60	0,58	0,57	0,60	0,58	0,54	0,72	0,62	0,55	0,54	0,54	0,54	0,46	0,50	0,46	0,38
17	0,96	1,00	0,91	0,82	0,86	0,74	0,79	1,09	1,03	0,90	0,70	0,53	0,56	0,54	0,69	0,72	0,63
18	1,11	0,95	0,97	0,80	0,73	0,75	0,70	0,67	0,60	0,58	0,55	0,54	0,65	0,65	0,60	0,61	0,58
19	1,84	1,73	1,66	1,46	1,42	1,38	1,35	1,30	1,11	1,08	1,05	1,03	1,04	0,99	0,98	0,99	0,84
20	0,35	0,33	0,34	0,31	0,35	0,33	0,33	0,32	0,30	0,29	0,29	0,28	0,30	0,31	0,33	0,37	0,37
21	1,66	1,53	1,43	1,27	1,26	1,19	1,20	1,17	1,07	1,06	1,12	1,18	1,24	1,24	1,39	1,51	1,45
22	2,49	2,39	2,32	2,20	2,11	1,96	1,93	1,95	1,85	1,92	2,07	2,13	2,00	1,85	1,88	1,86	1,76
23	0,97	0,79	0,82	0,82	0,72	0,67	0,72	0,74	0,69	0,71	0,74	0,71	0,81	0,77	0,78	0,76	0,76
24	1,94	1,49	1,57	1,57	1,51	1,13	0,83	0,63	0,85	0,64	0,54	0,36	0,36	0,35	0,37	0,35	0,24

Source: Own calculation, based on data from Eurostat Comext database.

Table 2 contains the results of the regression analysis of the agri-food trade between the United Kingdom and EU-27 countries. We can see that the value of β is between 0 and 1, and this suggests that agri-food commodity groups with initially high B indices have been declining, revealing declining comparative advantages in agri-food trade with EU-27. As it was mentioned, the degree of change also depends on R^2. Looking at the ratio β/R with value 0,3319 which is lower than 1, we can say, that the degree of specialization of the UK has decreased, which means that the competitiveness of UK in the agri-food trade with EU-27 countries is falling.

Table 2 **Stability of the B index between the years 2000 and 2016: SR, the UK with EU-27**

	Beta (β)	R^2	R	β/R
The United Kingdom	0,2405	0,5253	0,7248	0,3319

Source: Own calculation, based on data from Eurostat Comext.

4   Conclusion

In terms of agri-food trade, the EU27 (EU28-UK) is the UK's major trading partner. Approximately 71 % of all agri-food commodities are imported from EU, which means that the United Kingdom is dependent on agri-food imports from EU. On the other hand, EU is important for UK also because of exports, since the UK exports to EU market around 62 % of its agri-food production. An analysis of competitiveness of the United Kingdom with respect to EU-27 markets based on Balassa index shows that there are only three agri-food categories in which UK was able to retain comparative advantage over the whole 2000-2016 period – HS 03 Fish, HS 21 Miscellaneous edible preparations, HS 22 Beverages, spirits and vinegar. In 2016, the UK had comparative advantages only in these three categories, whereas at the beginning of monitored period, in 2000 it had comparative advantages in nine categories. This implies that the competitiveness of UK's agri-food commodities on EU-27 market has been falling over time. Based on regression analysis of the Balassa index which was focused on stability of distribution of Balassa indices over time, we can also conclude that the degree of specialization in the agri-food trade between the United Kingdom and the rest of the EU has been decreasing as the number of commodity groups with a comparative advantage has been declining. In 2016, the UK reached comparative disadvantages in 21 categories. With respect to Brexit, the agrarian trade of the UK deserves special attention, since the United Kingdom is net importer of agri-food commodities and the EU is its major trading partner. Moreover, currently when it comes to agri-food trade the UK is losing its competitiveness on EU-27 market. And although the future trading relationship is still not known, in case that the UK leaves the single market of the EU, it may mean worse trading conditions and it is highly possible that agri-food products will face largest increases in trade protection which may lead to decline in both exports as well as imports.

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REGIONAL DIFFERENCES IN THE SLOVAK DAIRY FARM PERFORMANCE

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Abstract

Milk sector in Slovakia significantly contributes to the domestic agricultural production in terms of value. In the paper we analysed regional differences in productivity and efficiency of dairy farms in Slovakia with regard to pooled sample technological frontier as well as with regard to particular regional frontiers over period 2004-2008. Technical efficiency and productivity changes were expressed by the Malmquist indices and estimated by non-parametric DEA. We used balanced panel FADN data of 106 dairy farms with prevailing dairy production. Dairy farms in all regions showed technical inefficiency, ranging from 11% in Western Slovakia (WS) to 23% in Eastern Slovakia. Western Slovakia dairy farms were the most efficient, with the highest level of technical efficiency and higher homogeneity of the farm performance. Differences in total technical efficiency, calculated with regard to both, the common and particular region frontier, result from differences in managerial efficiency rather than from differences in scale efficiency. We found only minor total factor productivity (TFP) improvement over the observed period. The highest average yearly productivity growth was observed in 2007 when the new programming period of RDP started and direct payments per livestock unit were introduced. The TFP growth resulted more from technological progress than from technical efficiency improvement and this technical efficiency change was driven mainly by managerial efficiency improvement. The highest TFP growth achieved Western and Eastern Slovakian farms, while the highest managerial efficiency improvement reached farms in Eastern Slovakia. Our findings suggest that policies designed to support improvement of efficiency of the Slovak dairy farm would have been desired.

Keywords: Data envelopment analysis, dairy farms, efficiency, Malmquist indices, productivity

JEL classification: *C61, Q12*

1   Introduction

Milk is produced in every single EU Member State without exception and represents approximately 15% of agricultural output in terms of value (EC, 2014). Milk production in the EU has been regulated by milk quota system, introduced in 1984 to address the overproduction problems. The milk quota system was abolished in April 2015. There were different predictions how the milk quota abolition could impact of dairy farming and milk production (e.g. Bouamra-Mechemache et al. 2008, Chantreuil et al. 2008, EC, 2009, Jansik et al., 2014). Generally, quota abolition was not expected to result in a radical change in the overall level of EU milk production or alteration in the process of farm restructuring, as the majority of EU member states already operated below quota constraints (Ernst & Young, 2013). Price volatility however became a serious problem of milk production and its processing. There are big differences regarding the average farm size and the farming systems among the EU Member States. On average, milk-specialised farms are larger in the old Member States (on average 54 dairy cows per farm). Bulgaria and Romania keep five dairy cows on average (EC, 2017).

In the paper we assess the Slovak regional differences of dairy farm efficiency and productivity over post-accession period until 2008, prior to period when agricultural markets instability increased.

1.1   Milk production in the SR and the EU

Although the Slovak milk production reached in 2009 only 1% of the EU milk production, the share of the domestic agricultural production was approximately 13%.

The share of specialized dairy farms in Slovakia, similarly as in the Czech Republic is considered the lowest in the EU (EC, 2014a). Livestock herds and animal production has been declining, especially since the accession to the EU. During 2004-2012 the average number of dairy cows was reduced by more than a quarter. The main factors were highly competitive imported dairy products, low profitability of milk production, the European milk crisis, the volatility in agricultural markets (Matošková et al., 2013). As a consequence, the total production of cow's milk in Slovakia fell by 11%. Moreover, Slovakia belongs to the EU MS with the lowest consumption of milk (166 kg per capita in 2015) (RIAFE, 2016). In order to prevent further decline of animal production in Slovakia, the complementary national direct payments on livestock units (LU) were introduced in 2007. In addition, promotion of milk and milk products consumption was supported.

Dairy farming after the accession to the EU has undergone significant modernization and gradual adaption to EU standards, improving the gene pool of

animals. During the years 1999-2007 share of crop production has been dominated in agricultural output. In 2007 there were 704 milk producers owning dairy quota, 40 of milk buying companies, 26 milk processing companies, 10 production and trade cooperatives and 4 trade companies (SZVM, 2007). The Slovak dairy production filled the nation milk quota only at approximately 79% in 2012. The milk production has been declining over the period 2007-2015. Among factors affecting fall of production and dairy cow's number in Slovakia were low competitiveness, increasing volatility in agricultural markets, increasing milk and dairy products import. After 2015 new specialised dairy farms have been expanding and addressing the milk crisis by investment to increase efficiency of their production.

There has been growing number of studies on national competitiveness, productivity and efficiency of dairy farms of individual or selected member states of the EU e.g. Reinhard et al. (2000), Luik et al. (2011), Omel and Luik (2014), Omel and Värnik (2014), Niskanen and Heikkilä (2014). Productivity and efficiency of dairy farms in Slovak and Czech regions NUTS II was analysed by e.g. van Berkum (2009), Michaličková et al. (2013), Cechura et al. (2014), Zdenek and Lososova (2014) and others. Zhu et al. (2012) assessed dairy farm efficiency for some European countries. They found that CAP subsidies granted since 1992 have not had a positive effect on efficiency in the dairy sector.

Zdenek and Lososova (2014) estimated the impact of factors affecting productivity in the milk sector in the EU Member States. The number of cows per worker was one of the most important factors affecting productivity. Both the Czech Republic and Slovakia showed lagging labour productivity with relatively high milk yield. Michaličková et al. (2013) also found low technical efficiency of milk production in Slovakia in the period 2006-2010. Cechura et al. (2014) analysed productivity and efficiency of the Czech and Slovak milk producers by regions, using parametric approach SFA (Stochastic Frontier Analysis). They used FADN data over 2004-2011.

Madau et al (2017) estimated technical efficiency and total factor productivity change of dairy farms in EU countries from 2004 to 2012, using DEA output-oriented approach and aggregated data. They used average farm data for each country and for each observed year. Their estimation of total factor productivity (TFP) and its components suggest that the European milk farms show small scope for improving technical efficiency and that the European milk sector has suffered a decline in productivity. Their results suggest that the ability of milk farmers to produce efficiently can only increase slightly in the future, implying that external factors (e.g., market shocks, milk price volatility) might play a crucial role in conditioning economic performance in the absence of milk quotas.

We estimated efficiency and productivity changes of the Slovak dairy farms in NUTS II regions on the basis of FADN data over the period 2004-2008. This post accession period with relatively stable economic conditions was chosen to assess regional differences prior the term when agricultural markets instability increased. While previous available studies assessed average economic performance of dairy farms on country level, we assumed and analysed significant regional differences in efficiency, productivity and hence differences in competitiveness of the Slovak dairy farms. Regional analysis of farm productivity and efficiency, decomposition of the productivity changes with emphasis on management and new technology contributions could provide valuable information on sources of farm economic performance and competitiveness.

2   Data and Methods

Technical efficiency and total factor productivity changes (measured by Malmquist indices) of dairy farms were estimated using non-parametric method Data Envelopment Analysis (DEA). Farm productivity and efficiency measures were calculated with regard to the frontier common for all three regions, as well as to particular region frontier. Total factor productivity change of dairy farms is expressed with the Malmquist indices (Färe et al. 1994). The Malmquist index is decomposed to technical efficiency change and technological changes. Technical efficiency change is then decomposed into pure technical (managerial) efficiency change and scale efficiency change.

A software DEAP (Coelli, 1996) was used to estimate measures of technical efficiency and productivity. We used FADN (Farm Accounting Data Network) panel data of 106 dairy farms from Western (WS), Middle (MS) and Eastern Slovakia (ES). The farms in the sample were those with dairy production exceeding 50% of their gross animal production over 2004-2008.

In the study following six inputs and two output variables were used. Output variables: 1. Milk production representing cows' milk and milk products (€); 2. Other production (€) representing farm output not included in milk production variable.

Input variables: 1. Labour expressed in annual work units (AWU), 2. Land represents total utilised agricultural area (UAA in ha). It consists of land in ownership, rented land and land in share-cropping. 3. Assets represent the total fixed assets and consist of agricultural land, farm buildings, forestry capital, buildings, machinery, equipment, breeding livestock (€); 4. Dairy cows (in livestock units LU), represent female bovines which have calved and are held principally for milk

production for human consumption. 5. Feed for grazing livestock (€); 6. Total specific costs (€).

3   Results and Discussion

3.1   Farm Sample Description

Generally, the average size of farms in Slovakia has been higher compared to the farm average size in majority of the EU Member States. In our farm sample extracted from the FADN SR (Table 1) large farms prevails, with an acreage between 1000 and 2000 ha and an average number of 100 to 300 cows, at both national and regional levels.

The average utilised agricultural area of a dairy farm in our sample was 1625 ha (Table 1). The Eastern Slovakia (ES) dairy farms were on average even bigger. The most frequent farm herd size in all regions was from 100 to 300 LU. The Western Slovakia dairy farms were the most productive in terms of average milk yield per cow (Table 2). Over the period 2004 -2008 average size of a dairy herd was declining, while milk yield and thus milk production was increasing. Similarly, the average number of AWU declined in all but Eastern Slovakia region.

There were differences in the level of labour productivity across the regions in our sample. Differences in labour productivity on farms were driven primarily by differences in labour requirements per LU.

Table 1 **Distribution of dairy farms in the sample (%)**

	Western Slovakia	Middle Slovakia	Eastern Slovakia	Western Slovakia	Middle Slovakia	Eastern Slovakia	Total
Utilised Agricultural Area in ha							
less than 500	15	13	9	25	33	42	100
500 - 1000	25	23	13	26	37	37	100
1000 - 2000	35	43	48	15	28	57	100
more than 2000	25	20	30	18	21	61	100
Total	100	100	100				
Dairy Cows in LU							
less than 100	20	10	16	25	19	56	100
100 - 300	55	63	63	17	29	54	100

	Western Slovakia	Middle Slovakia	Eastern Slovakia	Western Slovakia	Middle Slovakia	Eastern Slovakia	Total
more than 300	25	27	21	20	32	48	100
Total	100	100	100				

Source: Own estimation, FADN data.

3.2 Regional Differences in Efficiency and Productivity

Technical and scale efficiency were calculated with regard to the frontier common for all three regions (Table 3). For the whole period 2004-2008 the average technical efficiency, both CRS and VRS were highest for Western Slovakia (0.89; 0.92 respectively), the lowest levels were displayed for Eastern Slovakia (0.77; 0.80 respectively). This indicates that farms in WS can increase their output by 11% and ES farms by 23% without having to increase their input use, but both with respect to the best practice (technology) within the country sample. More Western Slovakia's farms were on, or closer to the common efficiency frontier than farms of the other regions.

Regional differences in total technical efficiency (under CRS) (Table 3) mainly result from differences in pure technical efficiency (under VRS) (0.92 vs. 0.80) rather than from differences in scale efficiency (0.97 vs. 0.96). Major source of performance differences among regions was managerial inefficiency and less inefficiency due to non-optimal scale. The development of all three yearly indicators is in accordance with above conclusions based on period averages.

Table 2 **Selected indicators of dairy farms in the sample**

Indicator	Western Slovakia		Middle Slovakia	
	mean	std dev	mean	std dev
Milk production (€)	430808	364313	371690	314108
Other production (€)	1235694	1003594	625618	602588
Labour (AWU)	64	48	50	36
Land (UAA)	1343	906	1498	1086
Average no. of dairy cows (LU)	251	206	259	184
Feeds (€)	259857	313785	246141	267528
Assets (€)	3294191	3083817	3260289	3358835
Specific costs (€)	664364	490955	392884	348377

Indicator	Eastern Slovakia		Panel	
	mean	std dev	mean	std dev
Milk production (€)	346153	326350	369353	332324
Other production (€)	825951	739834	846563	791054
Labour (AWU)	56	35	55	38
Land (UAA)	1793	1061	1625	1058
Average no. of dairy cows (LU)	245	183	250	188
Feeds (€)	213283	231935	231370	260324
Assets (€)	3550376	4165537	3419939	3768314
Specific costs (€)	548621	408210	526383	420824

Note: AWU - annual work unit, LU - livestock unit, UAA - utilised agricultural area, WS – Western Slovakia, MS – Middle Slovakia, ES – Eastern Slovakia.
Source: Own estimation, FADN data.

Table 3 **The average technical efficiency under CRS, VRS and SE scores. Pooled panel frontier**

Region		2004	2005	2006	2007	2008	Geomean
Pooled panel	TE CRS	0.79	0.82	0.78	0.82	0.79	0.80
	TE VRS	0.80	0.85	0.82	0.85	0.83	0.83
	SE	0.98	0.97	0.96	0.97	0.95	0.96
Western Slovakia	TE CRS	0.86	0.91	0.85	0.94	0.89	0.89
	TE VRS	0.88	0.92	0.89	0.97	0.93	0.92
	SE	0.97	0.99	0.96	0.97	0.96	0.97
Middle Slovakia	TE CRS	0.80	0.84	0.77	0.79	0.78	0.80
	TE VRS	0.82	0.86	0.80	0.82	0.83	0.83
	SE	0.98	0.97	0.97	0.97	0.94	0.97
Eastern Slovakia	TE CRS	0.75	0.79	0.75	0.79	0.76	0.77
	TE VRS	0.77	0.81	0.80	0.82	0.80	0.80
	SE	0.98	0.97	0.94	0.97	0.94	0.96

Note: CRS - constant returns to scale, VRS - variable returns to scale, SE – scale efficiency.
Source: Own estimation, FADN data.

In order to assess regional features, technical efficiency and scale efficiency were also calculated with regard to respective frontiers of regions (Table 4). Yearly and period average scores meaning are pertinent strictly in regional context. The highest regional scores are estimated for Western Slovakia. This suggests that within Western Slovakia performance of most of the farms are close to the best performing farms of the region (regional technology). The same pattern was observed for total efficiency, pure efficiency, as well as scale efficiency. This could be a result of a stronger farm competition in the WS region, while there was higher farm performance heterogeneity in remaining regions.

Decomposition of total efficiency to pure and scale efficiency (Table 4) suggests that inefficiency in Western Slovakia was more due to managerial inefficiency than non-optimal farms scale (0.95 vs 0.98). Trend analysis of the all three indicators show that both, total and pure efficiency have been improving. Scale efficiency shows negative tendency.

Situation in Middle Slovakia was very similar to the one in Eastern Slovakia. Lower level of average technical efficiency (TE CRS, TE VRS) might suggest that there were more farms far from the regional efficiency frontiers within both regions. The average total technical efficiency (0.87 vs. 0.88) and scale efficiency measures (0.97 vs 0.98) were almost identical. Pure efficiency scores were identical (0.9 vs 0.9). This three efficiency measures structure suggests that farms in the two regions were less productive mainly due to managerial inefficiency and then to non-optimal farms scale. Trend analysis shows slightly positive or stagnation tendencies in all three indicators.

Table 4 **The average technical efficiency under the CRS, VRS and SE scores. Regional frontiers**

NUTS II		2004	2005	2006	2007	2008	Geomean
Western Slovakia	TE CRS	0.92	0.94	0.92	0.96	0.92	0.93
	TE VRS	0.94	0.95	0.94	0.99	0.95	0.95
	SE	0.98	0.99	0.97	0.97	0.96	0.98
Middle Slovakia	TE CRS	0.88	0.88	0.84	0.86	0.90	0.87
	TE VRS	0.89	0.91	0.87	0.89	0.93	0.90
	SE	0.99	0.97	0.96	0.96	0.96	0.97
Eastern Slovakia	TE CRS	0.88	0.89	0.88	0.88	0.89	0.88
	TE VRS	0.77	0.91	0.89	0.91	0.91	0.90
	SE	0.99	0.98	0.98	0.97	0.98	0.98

Note: CRS - constant returns to scale, VRS - variable returns to scale, SE - scale efficiency.
Source: Own estimation, FADN data.

Table 5 **The average Technical Efficiency under the CRS, VRS and SE scores. Regional vs pooled panel frontier.**

	NUTS II	TE CRS	TE VRS	SE	Number of farms
Region	Western Slovakia	0.93	0.95	0.98	20
	Middle Slovakia	0.87	0.90	0.97	30
	Eastern Slovakia	0.88	0.90	0.98	56
Pooled panel	Western Slovakia	0.89	0.92	0.97	20
	Middle Slovakia	0.80	0.83	0.97	30
	Eastern Slovakia	0.96	0.80	0.96	56

Note: CRS - constant returns to scale, VRS - variable returns to scale, SE - scale efficiency, TE - technical efficiency.
Source: Own estimation, FADN data.

Dairy farm productivity changes in the pooled sample as well as in subsamples by regions over 5 years, measured by Malmquist indices, were minor (1%) and they resulted more from technological progress (1.01) (the introduction of new technology, innovation) than from technical efficiency improvement (1.0) (Table 6). Farm productivity changes were positive in Western and Eastern Slovakia although differed by years. The highest average yearly productivity growth in the pooled sample as well as in regions was observed in 2007, when new programming period RDP 2007-2013 started and direct payments per LU were introduced. TFP growth of dairy farms of the sample is evident mainly in years 2005 and 2007 and can be attributed to growth in technical efficiency and more significantly to technological change. It means that technically inefficient farms were able to catch-up efficient farms by 6% and 5%, respectively. Technological change however, was more pronounced in those two years, reaching 2% and 14% progress in technology.

Table 6 **Dairy farm productivity changes by regions and years (2004-2008)**

Year	Total factor productivity				Technical efficiency change			
	Panel	WS	MS	ES	Panel	WS	MS	ES
2005/2004	1.08	1.08	1.08	1.08	1.06	1.07	1.05	1.06
2006/2005	0.89	0.85	0.89	0.9	0.94	0.95	0.91	0.96
2007/2006	1.2	1.22	1.17	1.2	1.05	1.08	1.03	1.05
2008/2007	0.91	0.94	0.9	0.9	0.96	0.94	0.99	0.96
Geomean	1.01	1.01	1	1.01	1	1.01	0.99	1.01
Cumulative	1.05	1.05	1.01	1.05	1.00	1.03	0.97	1.03

	Technological change				Scale efficiency change			
	Panel	WS	MS	ES	Panel	WS	MS	ES
2005/2004	1.02	1.01	1.03	1.02	1	1.01	0.99	0.99
2006/2005	0.94	0.89	0.99	0.94	0.98	0.97	1	0.97
2007/2006	1.14	1.13	1.14	1.14	1.01	1.01	1	1.02
2008/2007	0.94	1	0.91	0.94	0.98	0.99	0.97	0.98
Geomean	1.01	1	1.01	1.01	0.99	1	0.99	0.99
Cumulative	1.03	1.02	1.06	1.03	0.97	0.98	0.96	0.96

	Scale efficiency change			
	Panel	WS	MS	ES
2005/2004	1	1.01	0.99	0.99
2006/2005	0.98	0.97	1	0.97
2007/2006	1.01	1.01	1	1.02
2008/2007	0.98	0.99	0.97	0.98
Geomean	0.99	1	0.99	0.99
Cumulative	0.97	0.98	0.96	0.96

Note: WS - Western Slovakia, MS - Middle Slovakia, ES - Eastern Slovakia
Source: Own estimation, FADN data.

Further decomposition of technical efficiency change into pure technical efficiency change and scale efficiency change indicate that technical efficiency change was driven mainly by pure (managerial) efficiency improvement (2005: 7%; 2007: 3%), while scale efficiency was stagnating.

According to cumulative values of estimated indicators over the whole period, the highest TFP growth of 5% was achieved by Western and Eastern Slovakian farms. The most evident technological progress was estimated for farms in

Middle Slovakia (6%). The best managerial (pure) efficiency improvement was achieved in farms of Eastern Slovakia, and modest worsening of scale efficiency was observed in Western Slovakian farms.

Our results show, that only 46% of dairy farms in the panel improved their technical efficiency towards the most efficient farms over the observed period (Table 7). Eastern Slovakia dairy farms were more successful in improving efficiency. Technical efficiency of 12% of dairy farms in the panel remained unchanged. Since 2004, technical efficiency fell down in half of dairy farms from the Middle Slovakia, 39% dairy farms from the Eastern Slovakia and the 35% dairy farms from the Western Slovakia in our sample. After the SR accession to the EU, only 19% of farms in the sample showed improvement of their total productivity by more than 10%.

Table 7 **Regional Dairy Farm Structure by Technical Efficiency Change**

Technical efficiency change	Panel		Western Slovakia		Middle Slovakia		Eastern Slovakia	
	No. Farms	Share %	No. Farms	Share %	No. Farms	Share %	No. Farms	Share %
More than 1	49	46	8	40	12	40	29	52
Equal 1	13	12	5	25	3	10	5	9
Less than 1	44	42	7	35	15	50	22	39
Total	106	100	20	100	30	100	56	100

Source: Own estimation, FADN data.

4   Conclusion

There is a low share of specialized dairy farms in Slovakia. In the analysed period milk is produced mainly in non-specialised farms. Large farms prevail in the sample, with an acreage between 1000 and 2000 ha and an average number of 100 to 300 cows in all three NUTS II regions of Slovakia with declining average acreage and herd size over time. Eastern Slovakia dairy farms were relatively larger, less competitive and lagging behind the Middle and Western Slovakia dairy farms in terms of productivity.

Estimated technical and scale efficiency with regard to the common frontier showed technical inefficiency for farms in all regions, ranging from 11% to 23%. Farms especially those in Eastern Slovakia showed large scope for improving efficiency using their own technical input. The best performance was revealed for the

Western Slovakia farms. Regional differences in total technical efficiency mainly resulted from differences in managerial inefficiency and in less extent from non-optimal scale. The efficiency and productivity measures have been improving over time.

Analysis of technical and scale efficiency measures with regard to regional frontier suggests stronger farm competition in Western Slovakia region, since farm performance there was more homogenous and close to the best performing farms. Cechura et al. (2014) analysed performance of the Czech and Slovak farms by regions and found significant differences in productivity. According to their results only farms from Western Slovakia can keep a pace with competitors.

Decomposition of farm inefficiency in our study was mainly a result of managerial underperformance and then to non-optimal farms scale in all Slovak regions.

Total factor productivity indices and their components showed variation over regions and time. The best results were achieved in 2007 what can be explained by support following from the new Rural Development Programme. Total factor productivity growth from 2004 to 2008 was found for farms from Eastern and Western Slovakia. This change was mainly driven by technological progress (improved economic conditions and availability of new technologies).

In the period from 2004 to 2008 farms in Western and Eastern Slovakia were more successful in catching up the best performing farms in their regions. The Middle Slovakia dairy farms however showed the highest technological improvement. The managerial efficiency increased especially in Eastern Slovakia dairy farms.

Relatively low TFP growth in all regions was affected by scale inefficiencies, non-optimal scale of farms, even farms in all regions improved their managerial efficiency. Madau et al. (2017) found similar results based on aggregated FADN data. They argue that the Slovak farms were technically inefficient, while pure efficiency change (managerial efficiency change) showed positive trend. In their study the Slovak farms also exhibited decreasing returns to scale, that means the sizes of the farms were, on average, supra-optimal and should be reduced to reach the optimal scale.

According to Zhu et al. (2012) CAP subsidies granted since 1992 have not had a positive effect on efficiency in the dairy sector. Madau et al. (2017) similarly do not recommend to support further improvement of farm efficiency by the EU policies, due to relatively low scope for improvement. The Slovak farms however were assessed as technically inefficient with low productivity by our and other studies.

Our findings of regional differences in the Slovak dairy farm performance suggest that policies designed to support improvement of efficiency of the Slovak dairy farm (direct payments) would have been desired. Development of total factor productivity changes and ability of the Slovak dairy farms to improve efficiency and productivity in the later period after 2007 was however affected by global crisis and growing instability of agricultural market, especially milk prices. In the period after 2008, combination of policies, such as policy directed to improving dairy farm efficiency and policies addressing exogenous factors, price volatility, agricultural market instability could enhance the Slovak dairy farm competitiveness. Our future study will investigate this development.

Acknowledgements

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DETERMINANTS OF EXPORT IN TRANSITION ECONOMIES: EVIDENCE FROM THE SOUTH EAST EUROPE (SEE-6) AND COMMONWEALTH OF INDEPENDENT STATES (CIS)

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Abstract

The main focus of this study is to analyse key determinants of export in transition economies of South East Europe (SEE-6) and Commonwealth of Independent States (CIS). Here we employ augmented gravity model to estimate impact of the key variables in export flows for the period 2005-2015. The Poisson Pseudo-Maximum Likelihood (PPML) estimator is used for stepwise estimations of the augmented gravity model, including effects of income differential, Diaspora, exchange rate and price stability, trade liberalization, institutional distance and infrastructure. In the last stage of this study we estimate the export potential for both regions. Findings suggest that export flow increases with increasing economic size, revealing higher impact of importer's absorbing potential comparatively to exporter's productive potential. On the other hand, growth in domestic demand, resulting from increase in population, leads to reduction of export. Moreover, exports are determined by low transportation costs (distance), adjacency proximity (sharing common border) and linguistic similarities. Diaspora residing in the importing countries facilitates export flows. Results of this study reveal that exchange rate variability has a positive impact, while bilateral institutional distance has diminishing effects on exports.

Keywords: *exports, gravity model, panel data, transition economies*

JEL classification: *F1, F12, C23, P2, P5*

1   Introduction

Transition economies in Europe and Central Asia include three main groups of countries: Central and Eastern European countries (CEE), South-East European countries (SEE) and Commonwealth of Independent States (CIS). This study is focused on Albania, Bosnia and Hercegovina, Kosovo, Macedonia, Montenegro, Serbia (SEE-6 or Western Balkan countries) and Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan (CIS countries). It analyses determinants of export flows within intraregional and interregional trade. The main motivation for our analysis is the growing importance of transition and emerging economies in the international market, which raises the need to know factors explaining increasing intensity of exports and successful penetration into new markets as an integral part of their economic growth.

One of the first steps of economic liberalisation was the creation of unions or free trade areas among transition countries. These were established at the very beginning of the transition process in order to enhance trade, to reduce trade barriers and to preserve partnerships based on common historical development and geographical proximity. In 1992, three countries in Central Europe, Poland, Hungary and Czechoslovakia (later split into Czech and Slovak Republic), founded the Central European Free Trade Agreement (CEFTA). Since then, CEFTA expanded by Slovenia, Romania, Bulgaria, Croatia, Macedonia, Albania, Bosnia and Herzegovina, Moldova, Montenegro, Serbia, and Kosovo. But CEFTA membership of countries that joined the European Union terminated when they become EU members. Nowadays, the parties of the CEFTA agreement are: Albania, Bosnia and Herzegovina, Macedonia, Moldova, Montenegro, Serbia and Kosovo (so called CEFTA 2006 countries – in 2006 the Agreement was substantially amended and South-Eastern European countries' membership was approved). On the other hand, countries in Eastern Europe and Central Asia formed the Commonwealth of Independent States (CIS) as a successor to the dissolved Soviet Union. Founding members are Belarus, Russia, Ukraine, Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Turkmenistan, Tajikistan, and Uzbekistan (1991); Georgia joined later (1993). Ukraine and Turkmenistan did not sign the CIS Charter adopted in 1993 so they are only associated members to the CIS. Twelve out of fifteen former Soviet republics participated in the CIS, but Georgia withdrew its membership in 2008 (Estonia, Latvia and Lithuania never joined). In 2011, CIS countries signed a multilateral Free Trade Agreement (except Tajikistan) relaxing import and export duties which replaced a series of former bilateral and multilateral agreements (Niemi, 2016). Moreover, Russia, Kazakhstan,

and Belarus formed the Eurasian Customs Union in 2010; by 2012 they implemented the four freedoms (free movement of goods, services, people and capital) and created the Eurasian Economic Space; and in 2014 they formed the Eurasian Economic Union. Since 2015, the Eurasian Economic Union has five members, it has been enlarged by Armenia and Kyrgyzstan (Zelenko, 2011; Niemi, 2016; Tarr, 2016).

Speed of the transition and liberalisation process and the level of economic growth in individual countries differ, as both are influenced not only by institutions and policies applied during transition but also by human and social capital, civil society involvement and trust, by initial conditions and persistent conflicts or wars in some regions (Tridico, 2011). Furthermore, efforts to meet the standards of EU and NATO membership have had a positive impact on the transition process, democracy and governance effectiveness (Luli, 2015; Börzel and Schimmelfennig, 2017) and WTO-membership has improved trade (Felbermayr and Kohler, 2006).

In general, economic liberalisation, as an effect of democratisation, has a positive impact on growth (Fidrmuc, 2003). The interconnection of stabilisation policies, structural reforms and trade liberalisation with economic growth is analysed and confirmed in many studies dealing with transition economies (Kaminski et al., 1996; Fischer and Sahay, 2000; Greenaway et al., 2002; Winters, 2004; Barlow, 2006; Wacziarg and Welch, 2008; Pjerotić, 2008; Nannicini and Billmeier, 2011; Trošt and Bojnec, 2016; Khusainov et al., 2017; Kilic and Beser, 2017). But the overall economic performance of transition countries is determined by economic policy (reforms) and initial conditions jointly, whilst the latter sometimes dominates the impact on growth (De Melo et al., 2001; Falcetti et al., 2002).

International trade also stimulates economic development and growth (Awokuse, 2007). Effects of trade liberalisation (removed export controls) on growth rates are very significant at the beginning of the transition period (Kaminski et al., 1996; Barlow, 2006). Wacziarg and Welch (2008) acknowledge that on average, transition countries with a liberalised trade regime experienced growth rates about 1.5 percentage points higher and trade to GDP ratio by 5 percentage points higher than before liberalisation, but they point out differences across individual countries. Exports from all transition countries increased since the process begun, yet by a higher rate in Central and Eastern European countries than in the Commonwealth of Independent States (Kandogan, 2006). Existing extensive analytical research includes the analysis of aggregate trade volumes between OECD and South-East European transition countries (Christie, 2002), EU trade with the Western Balkan (South-East European) countries (Montanari, 2005; Nuroglu and Kurtagic, 2012; Dragutinović-Mitrović and Bjelić, 2015; Gashi et al., 2017; Braha

et al., 2017), trade of Central and Eastern European countries with Euro area countries (Bussière et al., 2008), mutual trade among Western Balkan countries (SEE-6) and SEE-9 countries (Barlett, 2009; Pllaha et al., 2012; Gjipali et al., 2012; Sklias and Tsampra, 2013; Braha et al., 2014; Trivić and Klimczak, 2015), trade of the CIS countries with other world partners (Polyakov, 2001; Elborgh-Woytek, 2003; Freinkman et al., 2004; Shelburne and Pidufala, 2006; Shepotylo, 2009), specific conditions and intra-regional trade within the CIS (Kurmanalieva and Vinokurov, 2011; Jenish, 2013), estimation of potential of trade increase between the CIS and the EU (Babetskaia-Kukharchuk and Maurel, 2004).

The main objective of this paper is to provide a rigorous and comparative analysis of the key export determinants for two transitional regions - South East Europe (SEE-6) and Commonwealth of Independent States (CIS). This study provides estimates of baseline gravity, augmented with wide range of variables, such as border effects, cultural links, income differential, diaspora, price instability and exchange rate variability, free trade agreements, institutional distance and infrastructure. Studying trade patterns and identifying determinants of trade in transition economies are of interest to economists as well as to policy makers when designing policies aimed at trade and growth.

The paper is organized as follows. Section 2 describes methodology, estimation strategy, variables and data used in empirical estimation. Section 3 presents and discusses results. In the last section we conclude.

2 Data and Methods

2.1 Gravity model specification

Gravity model has become a workhorse (Eichengreen and Irwin, 1998) in international trade analysis. Bulk of empirical studies rank the gravity model among the most accurate tools in explaining and predicting bilateral trade. Conventional theory of gravity model in international trade emerged in the early 1960s with the pioneering studies of Tinbergen (1962) and Pöyhönen (1963). Later on, empirical works utilizing gravity model were initiated by Linnemann (1966). Since then, evolution of the gravity model and diversity of its application was remarkable.

Therefore, gravity model predicts that economically rich and geographically close countries trade more together than with third countries (Pokrivčák and Šindlerová, 2011). Main advantages of the gravity model lay on results of empirical work. Linders and De Groot (2006) suggest that the gravity model is particularly efficient in explaining a large portion of the variation in bilateral trade.

For the last fifty years, gravity equations have dominated empirical studies in international trade. In its basic form, the amount of trade between countries is assumed to be increasing in their sizes, as measured by national incomes, and decreasing in the cost of transportation between them (Cheng and Wall, 2005). Therefore, the basic form of the gravity equation is expressed as follows:

$$T_{ij} = \beta_0 \frac{GDP_{i\beta 1}GDP_{j\beta 2}}{DIST_{ij}} \beta_3 \quad (1)$$

where T_{ij} is bilateral trade between country i and j; GDP_i (GDP_j) is economic size of country i (j) measured by GDP; $DIST_{ij}$ is bilateral distance between the two countries; β_0 is a constant, β_1, β_2 and β_3 are parameters often estimated in a log-linear reformulation of the model. For the purpose of this study, we employ modified gravity model used by McCallum (1995). It is adjusted for logarithmic form and allows adding supplementary variables:

$$in \cdot x_{jj} = \beta_0 + \beta_1 lnGDP_j + lnGDP_j + \beta_3 lnDIST_{jj} + \beta_4 \delta_{ij} + \varepsilon_{ij} \quad (2)$$

where X_{ij} is trade flow from country i to country j (in our case export), GDP_i and GDP_j is GDP of the country i and country j, $DIST_{ij}$ is distance between country i and j, δ_{ij} is dummy variable for the other factors influencing trade flows, and ε_{ij} is error term.

We adopted the above equation to fit it to the gravity model for exports in SEE-6 and CIS countries. Further we adjusted the basic form of the gravity model equation for exports of analysed countries as follows:

$$ln\ x_{ij} = \beta_0 + \beta_1 lnGDP_i + \beta_2 lnGDP_j + \beta_3 lnPOP_i + \beta_4 lnPOP_j + \beta_5 lnDIST_{ij} + \varepsilon_{ij} \quad (3)$$

where X_{ij} is the value of agricultural exports from country i (exporter) to country j (importer). GDP_i and GDP_j stand for real GDP of country i and j, and measure economic size of the two economies. POP_i and POP_j are market size variables indicating population of the country i and j. $DIST_{ij}$ represents distance between country i and j. ε_{ij} is a stochastic disturbance term that is assumed to be well-behaved.

In order to estimate key determinants of export in transition economies, we follow a stepwise procedure. First, we estimate the baseline gravity model, aiming to determine coefficients of aggregate export flows (Model 1). Subsequently, we augment the baseline model with controlling variables such as income effects (Model 2), effects of adjacency, linguistic similarities and cultural links (Model 3), effects of Diaspora (Model 4), effects of bilateral exchange rate, inflation and Euro area (Model 5), effects of trade openness and RTA (Model 6), institutional distance

(Model 7), and infrastructure (Model 8). Lastly, we estimate pooled effects of all variables incorporated in the model (Model 9, see equation 4). For this purpose, the baseline model is modified with supplementary variables, as follows:

$$ln \cdot x_{ij} = \beta_0 + \beta_1 lnGDP_j + \beta_2 lnGDP_j + \beta_3 lnPOP_j + \beta_4 lnPOP_j + \beta_5 lnDIST_{ij} + \beta_6 GDPpc_{diff_{ij}} +$$

$$+ \beta_7 ADJ_{ij} + \beta_8 LANG_{ij} + \beta_9 LAND_{ij} + \beta_{10} COL_{ij} + \beta_{11} lnDIASP_{ij} + \cdot + \beta_{12}$$

$$\cdot lnEXR_{ij} + \beta_{13} INFi + \beta_{14} INFj + \beta_{15} EUROj + \beta_{16} OPEi + \beta_{17} CEFTA_{EEC_{ij}} + \beta_{18} SAA_{EAST_{eu}_{ij}}$$

$$+ \beta_{19} INST_{dist_{ij}} + \beta_{20} INFRA_j + \beta_{19} INFRA_j + \varepsilon_{ij} \quad (3)$$

where GDPpc_diff$_{ij}$ is income effect variable indicating income differential between exporter and importer. The next variables determine transportation costs. ADJ$_{ij}$ is a dummy indicating if country i and j share common land border. LAND$_j$ dummy shows whether importing country j is landlocked. Variables aiming to capture cultural and historical similarities, or transaction and information costs follow. LANG$_{ij}$ shows whether country *i* and *j* have a common primary language. COL$_{ij}$ indicates whether importer and exporter share common colonial links. DIASP$_{ij}$ is emigrants stock of Diaspora in importing countries. EXR$_{ij}$ is real exchange rate variable measured by the units of the importing country's home currency per the exporting country's currency and INF$_i$ and INF$_j$ represent inflation rate (annual CPI rate) in the exporting and importing country. EURO$_j$ indicates if the importing country is a member of the Euro area. OPE$_i$ is exporter's trade openness, CEFTA_EEC$_{ij}$ and SAA_EAST_eu$_{ij}$ stand for free trade agreements with CEFTA and European Union. INST_dist$_{ij}$ shows bilateral institutional distance between trading partners (see Linders et al., 2005). The last variables, INFRA$_i$ and INFRA$_j$ stands for World Economic Forum (WEF) exporter's and importer's infrastructure index.

For the purpose of this study we build panel database comprising export flows from SEE-6 and CIS exports to 46 import partners (EU-28, CEFTA 2006, EFTA, BRIC, USA, Japan and Turkey), time period 2005-2015.

2.2   Model variables

The dependent variable used in this study is aggregate export. In this paper, we utilize conventional income variables explaining bilateral trade flows. Exporter's GDP explains country's productive potential, while GDP of importing partner reflects absorbing potential, or purchasing power, respectively (see Koo et al., 1994). Theoretical framework of the gravity model predicts positive relationship

to trade for both variables. Population is another conventional variable injected in the model with the aim to explain relationship between market size and export flows. There is no a priori relationship between exports and the populations of either the exporting or importing country (Martinez-Zarzoso and Nowak-Lehmann, 2003; Armstrong, 2007). An estimated coefficient of population of the exporter may have negative or positive sign depending on whether the country exports less when it is big (absorption capacity) or whether a big country exports more compared to a small country (economies of scale).

In order to investigate effects of transportation costs we embrace the variable of geographical distance between the capital city of the exporting and importing countries. Increasing distance between trading partners proxies higher transport costs and decreases export flows. Therefore, gravity model predicts negative coefficient for this variable. Similarly, trade with landlocked countries involves higher trade costs, therefore negative coefficient is expected. On the other hand, lower transport and transaction costs are associated with neighbouring countries. Hence, we expect positive coefficient for the variable explaining exports with countries that share common border (see Anderson and Van Wincoop, 2001; Jansen and Piermartini, 2009).

The effects of trade liberalization are observed by incorporating dummy variables controlling for the impact of RTA with CEFTA 2006 countries (in force since 2007) and SAA with EU (in force since 2009), and openness of the economy.

Effects of exchange rate are frequently incorporated in gravity models (see Koo et al., 1994; Frankel and Wei, 1998). In our case, annual exchange rate is determined by the exporter currency units per one unit of the importing country currency. We expect that an increase in exchange rate would devaluate the exporter's currency, hence exports would be cheaper. In such a case, devaluation of the domestic currency should increase export. Therefore, as a result we expect a coefficient with a positive sign. We also expect that adopting Euro in importing countries stimulates bilateral trade. Another factor influencing trade flows is price stability. In order to capture effects of price stability here, we incorporate inflation rate (annual CPI rate) of trading partners in the model.

There is a common agreement that institutional quality has substantially positive impact on bilateral trade flows (De Groot et al., 2004) and reduces the level of uncertainty (Jansen and Nordås, 2004). Therefore, if trade is supported by an effective rule of law, and if government regulation is transparent, countries engage in more trade (Linders et al., 2005). Following De Groot et al. (2004) we measure effects of bilateral institutional distance between country pairs as follows:

$$INST\ dist_{ij} = \frac{1}{6} \sum_{k=1}^{6} = j(I_{ki} - I_{kj})^2 / V_k \quad (5)$$

where INST_dist$_{ij}$ is institutional distance, I$_{ki}$ indicates country i score on World Governance Indicator's *k*th dimension and V$_k$ is the variance of this dimension across all countries.

2.3 Choice of the gravity model estimator

For a discussion of the relative merits of the PPML estimator vs. other linear and non-linear estimators, the interested reader may refer to Silva and Tenreyro (2006), Silva and Tenreyro (2011), Egger and Staub (2016), and Head and Mayer (2014).

The choice of gravity equation estimator has been frequently debated among the scholars dealing with performance of the gravity model. Prevalence of heteroskedasticity and zero bilateral trade flows in the standard empirical methods were the focus of criticism (see Helpman et al., 2008; Westerlund and Wilhelmsson, 2009; Silva and Tenreyro, 2006). Hence, Silva and Tenreyro (2006) argue that standard empirical methods employed in estimating gravity equations are inconsistent and lead to biased results. They suggest that the use of standard loglinear estimator suffers from the presence of heteroscedasticity, which in turn might yield biased estimates of the true elasticities. On the other hand, various approaches have been employed in dealing with zero flows. Some authors suggest dropping the zero flows from sample (Linneman, 1966) or adding a constant to all trade flows to estimate log-linear equation (Rose, 2004).

Despite controversies and existence of wide range of estimation techniques such as Heckman model (Gomez-Herrera, 2013), FGLS (Martinez-Zarzoso, 2013), Helpman model (Helpman et al., 2008), Tobit model (Martin and Pham, 2008) etc. previous studies reveal that it is difficult to advocate a sole estimation technique as the best-performing. Choice of the method should be based on both economic and econometric considerations (Linders and De Groot, 2006) including robust specification checks and tests (Martinez-Zarzoso, 2013). For the purpose of this study, we adopted econometric approach using the Poisson Pseudo-Maximum Likelihood (PPML) estimator model, as proposed by Silva and Tenreyro (2006, 2011). PPML provides a natural way to deal with zero values and is robust to different patterns of heteroskedasticity. Even the critical voices (Martin and Pham, 2008) of PPML estimator suggest that in the case of small fraction of zero values, the PPML estimator model is the best performing method for the gravity model estimation.

2.4 Data

Data on export flows and selected variables included in the gravity model were utilized from several sources, such as UNCTAD, CEPII (Centre d'Etudes

Prospectives et d'Informations Internationales), WTO (World Trade Organization), World Bank and respective National Statistical Agencies. Data utilized in this study cover the period 2005-2015. Data on real Gross Domestic Product (GDP), population, exchange rate and inflation were acquired from the same sources. Data on distance between capital cities, together with dummies on cultural and historical links such as adjacency (sharing common land border), common primary language and former colonizer were obtained from the CEPII database. Data on common RTAs with trading partners were utilized from the WTO. Lastly, data for institutional distance were obtained from the World Governance Indicators (WGI) database (Kaufmann et al., 2010). Data on the stock of Diaspora residing in the importing countries were obtained from the World Bank migration database. Missing data for the given time period in the case of institutional variables and stock of migrants were interpolated. Definition of variables, expected coefficient signs and basic statistics of the employed variables are summarized in **Appendix Table 1 and 2**. Correlation matrix, presented in the **Appendix Table 3 and 4,** suggests that the issues related to multicollinearity are not present in the dataset. Data processing and empirical estimations were conducted on Stata 12.

3 Results and Discussion

Scatter diagram (**Figure 1**) plots relationship between exports (as percentage of GDP) and level of income (ln GDP per capita) in transition economies. As it is shown, advanced transition economies (new EU member states) reveal strong positive correlation between the level of economic prosperity and exports.

Figure 1 **Scatter plot of exports and GDP per capita across transition countries (2016)**

Source: World Bank (WDI); own processing.

3.1 Export growth in transition economies

Since the early 1990s, transition economies from the SEE-6 and CIS regions developed their productive and export potential, despite variations among different countries. As the result of successful reforms towards market economy and trade liberalization, transitional regions estimated nine-fold (SEE-6) respectively eight-fold (CIS) increase in the value of exports (**Figure 2**). As depicted in **Figure 2**, exports from transition economies were negatively affected by the recent financial crisis and recession in 2007-2008. In spite of impressive export growth, majority of transition economies remain net importers. As it is revealed from **Figure 3**, export/import coverage among SEE-6 economies is relatively low. While from the individual country perspective, trade deficit is particularly sharp in Kosovo, Albania and Bosnia and Herzegovina. Data from the **Figure 3** show that CIS region is net exporter. However, despite relatively well export performance in the regional context, majority of the CIS economies are net importers. Positive regional trade balance is mainly fuelled by Russian exports.

Figure 2: Export growth in SEE-6 and CIS 1995=100 (1995-2016)

Figure 3: Export/import coverage in SEE-6 and CIS (1995-2016)

Source: UNCTAD; own processing.

3.2 Structure of exports from SEE-6 and CIS

Structure of exports from SEE-6 is more diversified comparatively to CIS region (**Figure 4**). **Panel A** reveals that manufactured goods (including miscellaneous manufactured articles) constitute over 42 percent of total exports during the period 2008-2016.

On the other hand, exports from CIS region are heavily dependent on natural resources. Group of CIS countries (Azerbaijan, Kazakhstan, Russian Federation, Turkmenistan and Uzbekistan) are known as resource rich and oil-exporters. About 60 percent of the total CIS exports are based on gas and other oil production (**Figure 4, Panel B**).

Figure 4 **Export structure in SEE-6 and CIS (2008-2016)**

Figure 4: Export structure in SEE-6 and CIS (2008-2016)

Panel A: Export structure in SEE-6
- Manufactured goods — 23.4
- Miscellaneous manufactured articles — 18.7
- Machinery and transport equipment — 18.4
- Food and live animals Chemicals and related products, n.e.s. — 12.2
- Crude materials, inedible, except fuels — 8.3
- Mineral fuels, lubricants and related materials — 7.3
- Beverages and tobacco Commodities and transactions, n.e.s. — 5.8
- Animal and vegetable oils, fats and waxes — 3.1
- 1.7
- 1.2

percentage

Panel B: Export structure in CIS

Source: UNCTAD; own processing.

3.3 Destination of exports from SEE-6 and CIS

Our analysis reveal slight changes on geographical destination of the SEE-6 exports. Exports from SEE-6 depend on two key regional markets, EU common market and intra-regional (CEFTA-2006) market. Share of exports to EU common market embark steady expansion, showing positive trends. By year 2012 the SEE-6 exports to EU reached over 66 percent and by year 2016 it absorbed more than 70 percent of the total exports. (**Figure 5**, Panel A). However, share of inter-regional exports (CEFTA-2006) marked diminishing trend since 2008. Within 4 years the exports dropped by less than 1 percent. However the decrease continues at a slightly sharp rate reaching only 15.4 percent in year 2016. Such an outcome signals increasing competitiveness of the SEE-6 products towards international markets.

In coherence with SEE-6 pattern, main export markets for CIS exports remain EU-28 and intraregional market. However, CIS exports toward EU market marked significant decrease since year 2008. From year 2008 to 2012 the exports dropped over 7 percent and making things worse for CIS the trend continued until year 2016 reaching the total EU-28 exports from CIS only 41.8 percent. (**Figure 5**, Panel B). Similarly, intra-regional CIS exports marked slight decrease from 19.2 to 17.0 percent.

Figure 5 **Export destinations of the SEE-6 and CIS exports**

Panel A: Export destinations of the SEE-6

Panel B: Export destinations of the CIS

Source: UNCTAD; own processing

3.4   Estimation results of gravity model

Results of this study are coherent with findings from previous studies on transition economies. Estimations of the gravity model (for both SEE-6 and CIS) show that exporter's and importer's economic size (GDP) are positive and statistically significant in all models, revealing greater impact of domestic productive potential. Results suggest positive and significant relationship of export with importer's market size (Population), while negative significance coefficient prevails on the impact of exporter's population on export performance. As expected, this study shows that export flows are strongly and negatively influenced by transportation costs – respectively distance between trading partners. Similarly, the variable of sharing common border (adjacency) is found a positive and significant determinant of exports based on low transport costs. Interestingly, when testing relevance of income differential on export performance, results reveal confronting outcomes between SEE-6 and CIS. Thus, findings support the relative strength of Heckscher-Ohlin (HO) hypothesis in the case of SEE-6 and Linder hypothesis in the case of CIS countries. Linguistic similarities (common language) is found

positive and significant in all models for both regions, while low impact is revealed when controlling for effects of colonial links on export performance. Due to high stock of migrants living in importing countries, this study reveals significant positive impact of

Table 1 **PPML estimation results of the gravity model: SEE6 export**

Table 1: PPML estimation results of the gravity model: SEE6 export

Export	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
ln_GDP_imp	0.459***	0.132*	0.693***	0.126**	0.198***	0.648***	0.607***	0.227***	0.158
	0.040	0.063	0.041	0.046	0.044	0.043	0.052	0.054	0.097
ln_GDP_exp	1.421***	1.759***	1.311***	1.539***	1.581***	0.540***	1.265***	1.355***	1.020***
	0.127	0.144	0.114	0.122	0.137	0.134	0.138	0.144	0.153
ln_POP_imp	0.190***	0.530***	0.039	0.464***	0.422***	0.095*	0.003	0.425***	0.463***
	0.039	0.081	0.047	0.033	0.047	0.045	0.076	0.033	0.101
ln_POP_exp	-0.282	-0.589***	-0.213	-0.553***	-0.361*	0.935***	-0.009	-0.195	0.347*
	0.147	0.170	0.132	0.141	0.158	0.156	0.166	0.166	0.175
ln_DIST	-1.762***	-1.838***	-1.621***	-1.407***	-1.673***	-1.676***	-1.690***	-1.814***	-1.392***
	0.059	0.068	0.061	0.070	0.052	0.056	0.065	0.061	0.083
GDPpc_diff		0.443***							0.235*
		0.104							0.100
ADJ			0.398***						0.444***
			0.089						0.081
LANG			1.042***						0.862***
			0.093						0.115
LAND			-0.259***						-0.195**
			0.068						0.068
COL			0.022						0.172
			0.125						0.118
ln_DIASP				0.130***					0.044**
				0.016					0.016
ln_ER					0.0547**				0.019
					0.019				0.018
INF_imp					0.007				0.023
					0.012				0.014
INF_exp					-0.037***				-0.013
					0.009				0.009
EURO					0.605***				0.692***
					0.070				0.074
OPE_exp						0.025***			0.024
						0.003			0.003
CEFTA						1.132***			0.226
						0.125			0.126
SAA_su						0.260**			0.057
						0.079			0.081
INST_dist							-0.089**		-0.051
							0.028		0.029
INFRA_imp								0.248***	0.106*
								0.047	0.052
INFRA_exp								0.033	0.05
								0.058	0.057
_cons	-3.383**	-3.246**	-6.053***	-4.132***	-3.072*	-1.538	-3.701***	-1.499	-3.379**
	1.109	1.114	1.106	1.088	1.247	1.208	1.097	1.179	1.216
Observations	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970
R-squared	0.526	0.539	0.592	0.561	0.585	0.629	0.533	0.540	0.673

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Own processing

Diaspora in the case of both transition regions. Among price stability and exchange rate variables, this study finds significant but weak negative impact of inflation on export flows, while exporting in Eurozone tend to positively increase export flows. As expected, institutional distance between trading partners has

robust negative effects on exports, suggesting constraints of institutional quality within transition economies. Regional Trade Agreements (RTA), such as CEFTA 2006 and EEC, had positive impact on export facilitation in both regions. Lastly, results of our gravity model suggest that infrastructure has relatively insignificant impact on export flows from transition economies observed in this study.

Table 2 **PPML estimation results of the gravity model: CIS export**

Table 2: PPML estimation results of the gravity model: CIS export

Export	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
ln_GDP_imp	0.401***	0.475***	0.480***	0.357***	0.387***	0.467***	0.606***	0.526***	0.498***
	0.030	0.030	0.025	0.030	0.028	0.029	0.045	0.045	0.067
ln_GDP_exp	1.011***	0.844***	0.937***	0.994***	1.014***	1.002***	1.000***	1.227***	1.038***
	0.053	0.054	0.052	0.054	0.055	0.049	0.053	0.061	0.064
ln_POP_imp	0.224***	0.155***	0.136***	0.238***	0.236***	0.157***	0.006	0.127***	0.105
	0.032	0.030	0.030	0.034	0.030	0.033	0.046	0.038	0.059
ln_POP_exp	-0.235**	-0.060	-0.159*	-0.286***	-0.24*	-0.226**	-0.212**	-0.429***	-0.294***
	0.075	0.074	0.072	0.075	0.080	0.070	0.074	0.077	0.080
ln_DIST	-0.997***	-0.959***	-0.820***	-0.843***	-0.933***	-0.933***	-1.003***	-0.998***	-0.699***
	0.043	0.042	0.038	0.045	0.045	0.034	0.039	0.040	0.049
GDPpc_diff		-0.279***							-0.230***
		0.035							0.048
ADJ			0.448***						0.493***
			0.057						0.054
LANG			0.497***						-0.029
			0.098						0.092
LAND			0.040						0.052
			0.078						0.085
COL			0.088						-0.127
			0.069						0.081
ln_DIASP				0.064***					0.018
				0.010					0.010
ln_ER					0.000				-0.020
					0.015				0.015
INF_imp					0.021***				0.010***
					0.004				0.003
INF_exp					0.005				0.008*
					0.004				0.004
EURO					0.305***				0.573***
					0.088				0.093
OPE_exp						0.000			-0.002
						0.001			0.002
EEC						0.827***			0.670***
						0.053			0.129
EAST_eu						-0.453***			-0.292**
						0.105			0.110
INST_dist							-0.119***		-0.001
							0.031		0.038
INFRA_imp								-0.140**	-0.041
								0.054	0.052
INFRA_exp								-0.340***	-0.344***
								0.073	0.080
_cons	-2.629***	-1.857**	-4.256***	-3.460***	-3.268***	-3.767***	-4.157***	-3.974***	-4.534***
	0.588	0.576	0.515	0.580	0.571	0.586	0.534	0.559	0.633
Observations	6,468	6,468	6,468	6,468	6,468	6,468	6,468	6,468	6,468
R-squared	0.503	0.516	0.537	0.499	0.513	0.537	0.523	0.526	0.584

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Own processing

Table 3 **PPML estimation results of the gravity model: SEE6 and CIS export**

Table 3: PPML estimation results of the gravity model: SEE6 and CIS export

Export	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
ln_GDP_imp	0.377***	0.459***	0.470***	0.326***	0.353***	0.449***	0.563***	0.486***	0.439***
	0.029	0.029	0.025	0.029	0.026	0.028	0.043	0.044	0.061
ln_GDP_exp	0.939***	0.770***	0.870***	0.926***	0.953***	1.021***	0.916***	1.087***	0.969***
	0.054	0.054	0.052	0.055	0.055	0.053	0.054	0.060	0.062
ln_POP_imp	0.238***	0.163***	0.135***	0.257***	0.261***	0.167***	0.038	0.152***	0.144*
	0.032	0.031	0.029	0.034	0.030	0.033	0.045	0.039	0.056
ln_POP_exp	-0.026	0.146*	0.026	-0.091	-0.044	-0.050	0.020	-0.151*	-0.038
	0.071	0.069	0.068	0.070	0.074	0.066	0.071	0.073	0.067
ln_DIST	-0.958***	-0.921***	-0.776***	-0.799***	-0.895***	-0.864***	-0.948***	-0.949***	-0.585***
	0.041	0.041	0.037	0.043	0.043	0.032	0.038	0.040	0.041
GDPpc_diff		-0.291***							-0.255***
		0.034							0.047
ADJ			0.539***						0.580***
			0.058						0.055
LANG			0.569***						0.027
			0.094						0.082
LAND			0.021						0.029
			0.073						0.078
COL			0.013						-0.178*
			0.067						0.073
ln_DIASP				0.068***					0.027**
				0.010					0.010
ln_ER					0.032*				0.003
					0.014				0.014
INF_imp					0.020***				0.009**
					0.004				0.003
INF_exp					0.008*				0.004
					0.004				0.003
EURO					0.269***				0.583***
					0.084				0.092
OPE_exp						0.006***			0.005**
						0.001			0.002
CEFTA_EEC						0.919***			0.701***
						0.050			0.117
SAA_EAST_eu						-0.34***			-0.229*
						0.093			0.100
INST_dist							-0.110***		0.014
							0.030		0.036
INFRA_imp								-0.124*	-0.037
								0.052	0.052
INFRA_exp								-0.229***	-0.243***
								0.064	0.070
_cons	-2.659***	-1.898**	-4.409***	-3.469***	-3.354***	-5.524***	-4.072***	-3.792***	-5.980***
	0.611	0.590	0.538	0.597	0.593	0.624	0.553	0.587	0.673
Observations	9,438	9,438	9,438	9,438	9,438	9,438	9,438	9,438	9,438
R-squared	0.508	0.520	0.539	0.505	0.521	0.544	0.525	0.525	0.587

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Own processing

3.5 Discussion

Our aim has been to incorporate a more complex range of determinants to the model and to estimate their influence on export flows of SEE-6 and CIS countries.

Pllaha (2012) found out that trade flows in SEE-9 countries are pulled by GDP, FTAs, colonial links and contiguity. On the other hand, trade flows are mitigated

by physical transportation distance. They are also affected by previous trade flows. Gjipali et al. (2012) confirm the importance of historical, cultural, and political ties on trade in SEE countries. Being a part of the former Yugoslav market and sharing a common border are important stimulators of international trade in SEE. The number of days spent at the border and import or export costs have negative influence on trade (Toševska-Trpčevska and Tevdovski, 2014). Trade agreements, specifically CEFTA-2006, have had a positive effect on trade in Southeast Europe, which is estimated to be larger than the effect of Stabilisation and Association Agreements

(Petreski, 2013). Trivić and Klimczak (2015) conclude that non-economic factors (ease of a direct communication and similar religious structures) play the most important role in determining trade values between countries in the region of the Western Balkans.

Although CIS countries are not as integrated into the world markets as the EU countries (Shepotylo, 2009), they highly overtrade with each other (Kurmanalieva and Vinokurov, 2011). Besides traditional trade determinants, CIS trade patterns are influenced by trade agreements in the region (Kurmanalieva and Vinokurov, 2011) and institutional quality in the countries

(Kucharčuková et al., 2012). The convergence of institutions in CIS countries to EU and WTO standards would be a source of trade intensification between CIS and the EU (BabetskaiaKukharchuk and Maurel, 2004). Moreover, many Central Asian countries are land-locked which is associated with higher transportation costs. Land-lockedness and a higher number of border-crossings lead to a reduction of trade (Raballand, 2003). Damijan et al. (2015) sum up, that the size of the economy, foreign direct investments, export unit values, and the quality of institutions and infrastructure positively impact export supply.

4   Conclusion and recommendations

Current study is focused on identifying key determinants of exports from transition economies from SEE-6 and CIS. For such purpose paper employs gravity model approach utilizing Poisson Pseudo-Maximum Likelihood (PPML) estimator.

Main findings of the baseline model suggest consistency with findings from previous studies. Indeed, economic size has positive and statistically significant impact on export flows. Study finds higher positive coefficient with importer's market size, respectively population size of importing partner. Distance between trading partners has strong negative effect on export facilitation from transition economies. Such results suggest that exports are heavily dependent on low transportation costs. This outcome is supported by the robust coefficient of sharing common border.

Results from augmented gravity model convey mixed signals in the case of SEE-6 and CIS. Coefficient of income differentiation supports Heckscher-Ohlin (HO) hypothesis in the case of SEE-6, while Linder hypothesis prevails in the case of CIS countries. Moreover, cultural and linguistic links tend to play positive influence on export performance from both transition regions. Interestingly, study reveals relatively strong role of migrant stock (Diaspora) on export flows. These findings indicate that exports from transition economies are extensively dependent on low information costs. Therefore, presence of migrants in importing countries could serve as trade agents to bridge facilitation of exports from home countries. Findings of this study suggest that price stability determinants (inflation and exchange rate) have relatively weak negative influence on exports from transition economies. While, if importing partner is a member of Euro Area has strong positive impact on exports from SEE-6 and CIS. As expected, institutional differences (distance) between transition economies and their trading partners tend to diminish export flows. This findings stress out importance of enhancing qualitative and functional market-based institutions within transition economies. Trade liberalization variables (RTAs) affirm positive influence on export performance in both transition regions. Lastly, in contradiction with findings from previous studies, results of this study non significant role of infrastructure on exports from SEE-6 and CIS.

Findings of this paper aim contribute in identifying relevant factors in designing trade policies aiming export facilitation in transition economies.

Acknowledgements

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Appendix Table 1: **Definition, expected sign and summary statistics of the model variables, Western Balkans (WB-6)**

Variable	Code	Definition	Source	Period	Expected sign	Summary statistics				
						Obs	Mean	STD.	Min	Max
Export	Export	Value of exports (in million USD)	UNCTAD	2005-2015		2970	76.0	204	0.0	2,569
GDP (importer)	ln_GDP_imp	Log of real GDP of importer (in million USD)	World Bank	2005-2015	+	2970	12.12	2.14	7.72	16.71
GDP (exporter)	ln_GDP_exp	Log of real GDP of exporter (in million USD)	World Bank	2005-2015	+	2970	9.28	0.77	7.72	10.80
Population (importer)	ln_POP_imp	Log of population size (importer)	World Bank	2005-2015	+/–	2970	2.27	2.11	-3.36	7.22
Population (exporter)	ln_POP_exp	Log of population size (exporter)	World Bank	2005-2015	+/–	2970	0.87	0.76	-0.49	2.01
Distance	ln_DIST	Log of distance between capitals of exporter and importer	CEPII	2005-2015	–	2970	7.11	0.96	4.46	9.24
GDP p.c. differential	GDPpc_diff	Log of absolute difference in GDP per capita	World Bank	2005-2015	+/–	2970	1.64	0.92	0.00	3.92
Adjacency	ADJ	= 1 if trade partners share common border	CEPII	2005-2015	+	2970	0.10	0.30	0.00	1.00
Language	LANG	= 1 if trade partners share common language	CEPII	2005-2015	+	2970	0.08	0.27	0.00	1.00

Variable	Code	Definition	Source	Period	Expected sign	Summary statistics				
						Obs	Mean	STD.	Min	Max
Landlocked	LAND	= 1 if importer is landlocked, dummy	CEPII	2005-2015	–	2970	0.21	0.41	0.00	1.00
Colony	COL	= 1 if importer was former colonizer	CEPII	2005-2015	+	2970	0.03	0.17	0.00	1.00
Diaspora (migrant stock)	ln_DIASP	Log of exporter Diaspora residing in importing country	UN	2010-2015	+	2970	5.38	3.96	0.00	13.01
Exchange rate	ln_ER	Log of exchange rate between exporter/importer currency	UNCTAD	2005-2015	+/–	2970	2.38	1.86	0.00	5.74
Inflation (importer)	INF_imp	Inflation rate of the importer (CPI annual rate)	World Bank	2005-2015	–	2970	3.01	3.13	-4.48	16.12
Inflation (exporter)	INF_exp	Inflation rate of the exporter (CPI annual rate)	World Bank	2005-2015	–	2970	3.43	3.58	-2.40	16.12
Eurozone member	EURO	= 1 if importer is Eurozone member	EC	2005-2015	+	2970	0.34	0.47	0.00	1.00
Trade openness (exporter)	OPE_exp	Exporter's trade as goods as share (%) of GDP	World Bank	2005-2015	+	2970	89.69	16.54	60.45	133.48
CEFTA 2006	CEFTA	= 1 if RTA with CEFTA 2006	WTO	Since in force	+	2970	0.12	0.33	0.00	1.00
EU SAA	SAA_eu	= 1 if Stabilisation and Association Agreement (SAA)	WTO	Since in force	+	2970	0.26	0.44	0.00	1.00

Variable	Code	Definition	Source	Period	Expected sign	Summary statistics				
						Obs	Mean	STD.	Min	Max
Institutional distance	INST_dist	Institutional distance between exporter and importer	WGI	2005-2015	+/–	2970	2.75	2.55	0.00	10.59
Infrastructure (importer)	INFRA_imp	World Economic Forum (WEF) infrastructure index	WEF	2005-2015	+	2970	4.71	1.10	1.82	6.65
Infrastructure (exporter)	INFRA_exp	World Economic Forum (WEF) infrastructure index	WEF	2005-2015	+	2970	3.20	0.64	1.82	4

Appendix Table 2: **Definition, expected sign and summary statistics of the model variables, Commonwealth of Independent States (CIS)**

Variable	Code	Definition	Source	Period	Expected sign	Summary statistics				
						Obs	Mean	STD.	Min	Max
Export	Export	Value of exports (in million USD)	UNCTAD	2005-2015		6468	847	3,548	0	76,036
GDP (importer)	ln_GDP_imp	Log of real GDP of importer (in million USD)	World Bank	2005-2015	+	6468	12.04	2.07	7.75	16.71
GDP (exporter)	ln_GDP_exp	Log of real GDP of exporter (in million USD)	World Bank	2005-2015	+	6468	10.35	1.67	7.75	14.62
Population (importer)	ln_POP_imp	Log of population size (importer)	World Bank	2005-2015	+/–	6468	2.40	1.98	-3.36	7.22
Population (exporter)	ln_POP_exp	Log of population size (exporter)	World Bank	2005-2015	+/–	6468	2.38	1.12	1.09	4.97

Variable	Code	Definition	Source	Period	Expected sign	Summary statistics				
						Obs	Mean	STD.	Min	Max
Distance	ln_DIST	Log of distance between capitals of exporter and importer	CEPII	2005-2015	–	6468	7.86	0.71	5.13	9.54
GDP p.c. differential	GDPpc_diff	Log of absolute difference in GDP per capita	World Bank	2005-2015	+/–	6468	1.96	1.19	0.00	5.73
Adjacency	ADJ	= 1 if trade partners share common border	CEPII	2005-2015	+	6457	0.09	0.29	0.00	1.00
Language	LANG	= 1 if trade partners share common language	CEPII	2005-2015	+	6468	0.02	0.15	0.00	1.00
Landlocked	LAND	= 1 if importer is landlocked, dummy	CEPII	2005-2015	–	6468	0.27	0.45	0.00	1.00
Colony	COL	= 1 if importer was former colonizer	CEPII	2005-2015	+	6468	0.04	0.21	0.00	1.00
Diaspora (migrant stock)	ln_DIASP	Log of exporter Diaspora residing in importing country	UN	2010-2015	+	6468	6.24	3.74	0.00	15.05
Exchange rate	ln_ER	Log of exchange rate between exporter/importer currency	UNCTAD	2005-2015	+/–	6468	3.25	2.41	0.00	10.10
Inflation (importer)	INF_imp	Inflation rate of the importer (CPI annual rate)	World Bank	2005-2015	–	6468	4.18	5.42	-4.48	59.22
Inflation (exporter)	INF_exp	Inflation rate of the exporter (CPI annual rate)	World Bank	2005-2015	–	6468	9.53	8.32	-2.67	59.22

Variable	Code	Definition	Source	Period	Expected sign	Summary statistics				
						Obs	Mean	STD.	Min	Max
Eurozone member	EURO	= 1 if importer is Eurozone member	EC	2005-2015	+	6468	0.31	0.46	0.00	1.00
Trade openness (exporter)	OPE_exp	Exporter's trade as goods as share (%) of GDP	World Bank	2005-2015	+	6468	92.81	28.33	42.84	163.34
Eurasian Economic Community	EEC	= 1 if member of Eurasian Economic Community (EEC)	WTO	Since in force	+	6468	0.10	0.30	0.00	1.00
EU East Partnership	EAST_eu	= 1 if East Partnership with EU	WTO	Since in force	+	6468	0.18	0.39	0.00	1.00
Institutional distance	INST_dist	Institutional distance between exporter and importer	WGI	2005-2015	+/–	6468	3.14	2.84	0.00	12.43
Infrastructure (importer)	INFRA_imp	World Economic Forum (WEF) infrastructure index	WEF	2005-2015	+	6468	4.60	1.13	2.20	6.65
Infrastructure (exporter)	INFRA_exp	World Economic Forum (WEF) infrastructure index	WEF	2005-2015	+	6468	3.35	0.64	2.20	4.82

Source: Own processing

Appendix Table 3: **Correlation matrix, South East Europe (SEE6)**

	1	2	3	4	5	6	7	8
1 Export	1.00							
2 ln_GDP_imp	0.06	1.00						
3 ln_GDP_exp	0.35	0.01	1.00					
4 ln_POP_imp	0.08	0.86	-0.01	1.00				
5 ln_POP_exp	0.30	-0.01	0.93	-0.01	1.00			
6 ln_DIST	-0.27	0.60	-0.02	0.47	-0.02	1.00		
7 GDPpc_diff	-0.11	0.28	-0.05	-0.17	0.02	0.37	1.00	
8 ADJ	0.29	-0.36	0.04	-0.18	0.02	-0.54	-0.41	1.00
9 LANG	0.25	-0.34	0.04	-0.18	0.02	-0.43	-0.38	0.63
10 LAND	0.00	-0.26	-0.01	-0.31	-0.01	-0.34	0.08	0.13
11 COL	0.01	0.07	-0.01	0.12	0.01	-0.05	-0.13	0.01
12 ln_DIASP	0.34	0.21	0.24	0.02	0.24	-0.25	0.26	0.15
13 ln_ER	0.16	-0.04	0.30	-0.03	0.30	-0.04	-0.01	0.11
14 INF_imp	-0.03	-0.06	-0.03	0.18	-0.01	0.03	-0.34	0.05
15 INF_exp	0.14	-0.01	0.40	0.00	0.34	-0.01	-0.05	0.05
16 EURO	0.11	0.16	0.02	-0.06	0.00	0.01	0.38	-0.19
17 OPE_exp	0.02	0.01	-0.21	0.00	-0.43	0.00	-0.08	0.02
18 CEFTA	0.14	-0.47	0.04	-0.22	0.00	-0.49	-0.46	0.54
19 SAA_eu	0.04	0.04	-0.04	-0.05	-0.12	-0.04	0.11	-0.10
20 INST_dist	-0.13	0.18	0.03	-0.23	0.10	0.29	0.85	-0.33
21 INFRA_imp	-0.03	0.42	0.04	-0.01	0.00	0.42	0.79	-0.39
22 INFRA_exp	0.04	0.04	-0.03	0.01	-0.20	0.00	-0.06	0.01

	9	10	11	12	13	14	15	16
1 Export								
2 ln_GDP_imp								
3 ln_GDP_exp								
4 ln_POP_imp								
5 ln_POP_exp								
6 ln_DIST								
7 GDPpc_diff								
8 ADJ								

	9	10	11	12	13	14	15	16
9 LANG	1.00							
10 LAND	0.16	1.00						
11 COL	-0.05	0.02	1.00					
12 ln_DIASP	0.19	0.09	0.03	1.00				
13 ln_ER	0.09	0.05	-0.01	0.11	1.00			
14 INF_imp	0.02	-0.08	0.26	-0.20	-0.02	1.00		
15 INF_exp	0.03	0.00	-0.01	0.06	0.13	0.24	1.00	
16 EURO	-0.21	-0.06	-0.08	0.20	0.00	-0.30	-0.02	1.00
17 OPE_exp	0.04	0.01	-0.03	-0.02	-0.03	0.04	0.01	0.01
18 CEFTA	0.57	0.13	-0.01	0.02	0.05	0.09	-0.01	-0.27
19 SAA_eu	-0.14	-0.04	-0.10	0.07	0.23	-0.26	-0.20	0.31
20 INST_dist	-0.29	0.08	-0.13	0.28	-0.05	-0.34	0.01	0.29
21 INFRA_imp	-0.33	0.03	-0.09	0.28	-0.01	-0.45	-0.07	0.41
22 INFRA_exp	0.00	0.00	0.00	-0.05	-0.05	-0.23	-0.23	0.08

	17	18	19	20	21	22
1 Export						
2 ln_GDP_imp						
3 ln_GDP_exp						
4 ln_POP_imp						
5 ln_POP_exp						
6 ln_DIST						
7 GDPpc_diff						
8 ADJ						
9 LANG						
10 LAND						
11 COL						
12 ln_DIASP						
13 ln_ER						
14 INF_imp						
15 INF_exp						
16 EURO						
17 OPE_exp	1.00					

	17	18	19	20	21	22
18 CEFTA	0.02	1.00				
19 SAA_eu	0.28	-0.22	1.00			
20 INST_dist	-0.19	-0.37	-0.01	1.00		
21 INFRA_imp	0.02	-0.42	0.18	0.74	1.00	
22 INFRA_exp	0.15	0.09	0.33	-0.08	0.18	1.00

Source: Own processing.

Appendix Table 4: **Correlation matrix, Commonwealth of Independent States (CIS)**

	1	2	3	4	5	6	7	8
1 Export	1.00							
2 ln_GDP_imp	0.17	1.00						
3 ln_GDP_exp	0.42	0.00	1.00					
4 ln_POP_imp	0.16	0.80	-0.01	1.00				
5 ln_POP_exp	0.40	-0.01	0.86	-0.01	1.00			
6 ln_DIST	-0.07	0.38	-0.12	0.19	-0.07	1.00		
7 GDPpc_diff	-0.16	0.20	-0.40	-0.21	-0.17	0.37	1.00	
8 ADJ	0.20	-0.09	0.14	0.09	0.15	-0.52	-0.29	1.00
9 LANG	0.12	-0.03	0.11	0.04	0.09	-0.11	-0.08	0.23
10 LAND	-0.08	-0.37	0.01	-0.27	0.01	-0.19	-0.04	0.10
11 COL	0.17	-0.02	0.26	0.08	0.26	-0.15	-0.12	0.33
12 ln_DIASP	0.25	0.09	0.37	0.18	0.35	-0.41	-0.22	0.33
13 ln_ER	-0.01	-0.02	0.10	-0.06	0.08	-0.07	-0.03	0.01
14 INF_imp	0.02	-0.21	-0.02	0.11	-0.01	-0.20	-0.31	0.19
15 INF_exp	0.02	0.00	0.13	0.00	0.19	-0.10	0.01	0.03
16 EURO	0.04	0.18	0.02	-0.10	0.00	0.12	0.30	-0.19
17 OPE_exp	-0.23	0.01	-0.45	0.01	-0.48	-0.11	0.11	-0.07
18 EEC	0.03	-0.21	-0.01	0.06	-0.01	-0.18	-0.19	0.23
19 EAST_eu	-0.08	0.05	-0.03	-0.08	-0.15	-0.22	0.00	-0.07
20 INST_dist	-0.03	0.20	-0.01	-0.27	0.07	0.32	0.65	-0.26
21 INFRA_imp	0.05	0.47	0.04	-0.08	0.00	0.33	0.58	-0.26
22 INFRA_exp	0.23	0.03	0.65	-0.01	0.37	-0.13	-0.39	0.07

	9	10	11	12	13	14	15	16
1 Export								
2 ln_GDP_imp								
3 ln_GDP_exp								
4 ln_POP_imp								
5 ln_POP_exp								
6 ln_DIST								
7 GDPpc_diff								
8 ADJ								
9 LANG	1.00							
10 LAND	0.06	1.00						
11 COL	0.25	0.00	1.00					
12 ln_DIASP	0.22	0.00	0.35	1.00				
13 ln_ER	-0.06	0.02	-0.06	0.09	1.00			
14 INF_imp	0.16	0.07	0.17	0.20	0.01	1.00		
15 INF_exp	0.04	0.01	-0.01	0.08	0.23	0.06	1.00	
16 EURO	-0.10	-0.15	-0.12	-0.03	0.14	-0.31	0.00	1.00
17 OPE_exp	0.00	0.00	-0.19	-0.16	-0.04	0.03	0.30	0.00
18 EEC	0.37	0.26	0.32	0.31	0.00	0.44	0.00	-0.23
19 EAST_eu	-0.05	-0.10	-0.10	0.06	0.02	-0.23	0.01	0.29
20 INST_dist	-0.13	-0.09	-0.18	-0.24	0.07	-0.39	0.05	0.33
21 INFRA_imp	-0.15	-0.19	-0.14	-0.09	0.06	-0.48	-0.02	0.44
22 INFRA_exp	0.03	0.01	0.14	0.24	-0.01	-0.09	-0.05	0.05

	18	19	20	21	22
1 Export					
2 ln_GDP_imp					
3 ln_GDP_exp					
4 ln_POP_imp					
5 ln_POP_exp					
6 ln_DIST					
7 GDPpc_diff					
8 ADJ					
9 LANG					

	18	19	20	21	22
10 LAND					
11 COL					
12 ln_DIASP					
13 ln_ER					
14 INF_imp					
15 INF_exp					
16 EURO					
17 OPE_exp					
18 EEC	1.00				
19 EAST_eu	-0.15	1.00			
20 INST_dist	-0.34	-0.03	1.00		
21 INFRA_imp	-0.41	0.19	0.70	1.00	
22 INFRA_exp	-0.01	0.33	-0.12	0.13	1.00

Source: Own processing.

SENSITIVITY OF SLOVAK DEMAND FOR CIGARETTES TO PRICE CHANGE

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Abstract

In 2015 was 10th anniversary of WHO Framework Convention on Tobacco Control. The effort of decreasing tobacco consumption in the world runs by several methods as cancelation of small package of cigarettes, pubs and restaurants smoking restrictions, health warnings and imagines of diseases caused by smoking, and the most important - price increasing by taxation. Therefore the main aim of this paper is estimate price elasticity of demand for cigarettes in Slovakia by applying Heckman sample selection model on Households Budget Survey data for time period 2006-2012. We also investigate difference in price elasticity between households with light, moderate and heavy cigarette consumption by quantile regression. Results show that price of demand for cigarettes is inelastic and has decreasing trend with higher cigarettes consumption.

Keywords: *cigarettes, Heckman sample selection, price elasticity, smoking, quantile regression*

JEL classification: *C24, C31, I10 Q11*

1   Introduction

Negative effect of smoking on health is well known. Many studies confirm that cigarettes and other tobacco product causes serious health damage and death (WHO, 2015; Jha, 2009; Doll, *et al.*, 2004; HHS, 2004). World Health Organization (2017) state that tobacco kills almost half of its users and yearly died more than 7 mil. people as the result of direct or indirect – second hand tobacco using. These are the main reasons why smoking cessation efforts are constantly growing around the world. WHO in 2005 introduce Framework Convention on Tobacco

Control with several policies – monitoring, smoke-free environments, cessation programmes, warning labels, mass media, advertising bans and taxation. In 2015 more than half of world´s countries have implemented one or more from these policies at the highest level of accomplishment (WHO, 2015).

The enormous increase in smoking occurred during world wars. After increasing in knowledge of the negative effect of smoking on health in later twentieth century it became less popular. Currently prevalence of smoking declined in North America and Western Europe, but tobacco companies focussed their promotions into less developed countries in Africa, the Middle East, Asia or Latin America (Cancer Council, 2017). Smoking prevalence across countries with different income levels shows Figure 1.

Figure 1 **Adult tobacco smoking prevalence 2007-2013**

Source: WHO Report on the Global Tobacco Epidemic, 2015.

In the most EU countries number of smoker has decline between 2006 and 2014, but remained stable since then. The highest decrease in proportion of smokers was in UK - 16 percentage points (pp) and Denmark - 13 pp. Percentage of smokers in European countries are in Figure 2. Smoking in Slovakia had declining trend till 2014 and since then it raises. According to results from Eurobarometer in 2017 smoked 26 % of Slovaks what is equal to EU average, while in 2014 had smoked only 21 % of citizens and in 2006 it was 25 % (Eurobarometer, 2017).

Figure 2 **Proportion of smokers (%) in EU countries, 2017**

Source: Special Eurobarometer 458: Attitudes of Europeans towards tobacco and electronic cigarettes.

In 2007 WHO presented several policies also known as MPOWER. This policies represent methods as cancelation of small package of cigarettes, smoking restrictions in pubs and restaurants, health warnings and graphic picture of diseases caused by smoking, etc. As the most important policy WHO identify taxation which has strong influence on price increasing in tobacco products. Government use tax policy as a main tool for reducing smoking, because price is major determinant which influence cigarette consumption (Bosanquet, 1992, Godfrey and Maynard, 1988, Townsend, 1994). Majority of smokers and ex-smokers identify price as an important factor when choosing brand of cigarettes. In Slovakia 86 % of respondent answered this way, which was the 6th highest number (first was Greece with 92 %), while in North EU countries it was less than 40 % (Eurobarometer, 2017). Saenz-de-Miera (2010) analysed changes in consumption after cigarette tax increase. Consumption generally declined, but people who smoke more than 5 cigarettes a day had worse response on higher tax, also heavier smokers are less likely to quit smoking. Boulos et al. (2009) found statistically significant differences between light, moderate and heavy smokers. Light smokers were mostly younger with higher levels of education and they have higher willingness

to stop smoking. Based on these results we expect that differences between mentioned groups of smokers will be also possible to observe from our estimation of price elasticity. We expect that price elasticity of light smoking households will be higher that moderate and heavy smoking households, also because cigarettes can be considered as addictive goods. Historical estimations of cigarettes price elasticity vary widely, Herbert and Simon (1968). Referred elasticities are from -0.10 – 1.48, Chen et al. (2013) even presented -0.044. We expect similar values – price elastic demand for light smokers and with rising consumption of cigarettes change to inelastic.

2   Data and methodology

For analysis we use data from Household Budget Survey in Slovakia 2006-2012. Because of missing prices, we calculated them by dividing expenditure on cigarettes by quantities of cigarettes consumed by household. This calculation method also used Sousa, 2014. There remains households with zero consumption and therefore with zero prices. For these households we calculated average prices by region, quarter and year and substitute the missing prices with these average prices. The same approach suggest Cox and Wohlgenant (1986).

For estimation we use model firstly proposed by Heckman in 1976 to treat the censoring of observations, because in database is significant number of household with zero expenditure on cigarettes. Similar approach was used on estimation price elasticities of demand for alcohol (Sousa, 2014; Jamrich and Zima, 2017), which is also defined as addictive goods We are trying to find condition, based on we make households more or less likely to be in the sample. Final sample selection variable is not omitted.

Model has two equations. First is a participation equation, where we estimate the probability that a households has a non-zero observation. Assume two part model where a participant is fully observed outcome. We need to define dummy variable d:

- for participants   d = 1 if y > 0,
- for nonparticipants d = 0 if y = 0.

Quantity equation – in case that a household consumes cigarettes, we estimate amount of this consumption.

$$d_{ij} = Z_j\beta_i + logP_j\gamma_i + X_j\delta_i + e_i$$

$$logY_i = logP_j\varphi_i + X_j\pi_i + \varnothing_i\lambda_{ij} + u_{ij} \; (1)$$

where Z_j are instruments, P_j are prices, X_j are control variables and Y_i are dependent variables, then

$$E[u_i \mid d_i = 1] \neq E[u_i] = 0 \text{ and } E\left(y_i \mid x_i, d_i = 1\right) = x_1\beta + E[u_i \mid d_i = 1] \quad (2)$$

shows that Heckman model treats selection bias, because variable causing the bias is in the equation. Heckman proposed write out the determinants of d_i and estimate bias factor to solve selection bias problem with using truncated normal distribution $X \sim N(\mu, \sigma2)$ and a is a constant,

$$E[X \mid X > a] = \mu + \sigma\lambda(\alpha) \text{ where } \alpha = \frac{a - \mu}{\sigma} \text{ probability density function is } \varnothing(\alpha) \text{ and}$$

$$\text{inverse Mills ratio is given as } \lambda(\alpha) = \frac{\varphi(\alpha)}{1 - \Phi(\alpha)} = \frac{\varphi(\alpha)}{\Phi(-\alpha)}$$

Omitted variable bias is a function of the inverse Mills ratio and for solving this problem we estimate the inverse Mills ratio for each observation and contain it in equation, which will be:

$$y_i = x_i^*\beta + \delta\lambda_i + u_i \quad (3)$$

In case that this is the only source of bias in the equation, then the estimator λ will be consistent and unbiased.

Participation part is probit, so that means estimation by maximum likelihood function:

$$L = \prod_{y_{t=0}} 1 - \Phi\left(\frac{w_i\gamma}{\sigma_d}\right) \prod_{y_i > 0} \Phi\left(w_i\gamma + \frac{\sigma_{dy}}{\sigma_y^2}\left(y_i - x_i\beta\right) \sqrt{\sigma_d^2 - \frac{\sigma_{dy}^2}{\sigma_d^2}}\right) \times \frac{1}{\sigma_y}\varphi\frac{(y_i - x\beta)}{\sigma_y} \quad (4)$$

For estimation price elasticities of light, moderate and heavy smokers we use quantile regression. Application of this model is appropriate because it is likely that influence of independent variables vary across quantiles in comparison with estimation of average by OLS (Koenker a Bassett, 1978; Koenker a Hallok, 2001). The same approach used Rizov et al. (2014), Cupak et al. (2016) for capturing differences in household's consumption across subsamples. Quantile regression is also more robust method, because it is not sensitive to normality of error distribution or to the outliers in the data. Model can be written as

$$y_t = x_t\beta_0 + \varepsilon_{\theta t} \quad (5)$$

where y_t is dependent variable, $x_i^{'}$ represent explanatory variables, β_θ is coefficient in θ quantile of dependent variable and $\varepsilon_{\theta i}$ is an error term. Variables used in these models are shown in Table 1.

Table 1 **Variables used in models**

Dependent variable (Y)	Definition
ln_cig	log number of smoked cigarettes by household per month
Explanatory variable (P)	**Definition**
ln_p_cig	log price of cigarettes
Instruments (Z)	**Definition**
ln_income	log income of household per month
male_hh	dummy variable, 1 – head of household is a man, 0 - woman
employed_hh	dummy variable, 1 – head of household is employed, otherwise 0
edu2	dummy variable, 1 – head of household has high school education, 0 – primary education
edu3	dummy variable, 1 – head of household has university education, 0 – primary education
n_adults	number of adults in household
year	trend for period 2006 - 2012

Source: Own processing.

3   Results and discussion

Between 2006 and 2012 price of cigarettes increase rapidly. Figure 3 shows average price of box of cigarettes calculated from HBS data. Average number of cigarettes smoked to all Slovak households was 92 per month in 2012, but when we count only households with positive expenditure, number of smoked cigarettes is more than triple. Overall trend was decreasing. Number of smoking households in our dataset is 11 595 and non-smoking 22 778.

Figure 3 **Relation between average price of cigarettes and amount of cigarettes smoked by household**

Source: HBS, authors´ calculations.

Estimated price elasticity is 0.92, which mean that 1 % change in price cause 0.92 % decrease in consumption of cigarettes. Elasticity is lower than one, therefore is inelastic. With higher income is related higher smoking, also households with male as a head have higher consumption of cigarettes. Employment and better education lower amount of cigarettes smoked. Higher income, drinking household or household with employed head have positive influence on fact, that household will be smoking. Details are in Table 2.

Table 2 **Estimation of price elasticity of demand for cigarettes in Slovakia by Heckman sample selection model**

	Coefficients	Robust Std. Err.	[95% Conf. Interval]	
ln_cig				
ln_p_cig	**-.9214477*****	.0501194	-1.01968	-.8232156
ln_income	.1148679***	.0263369	.0632485	.1664873
male_hh	.0729091***	.0181642	.037308	.1085102
employed_hh	-.3386446***	.0302694	-.3979716	-.2793176
edu2	-.0510501*	.0269521	-.1038754	.0017751
edu3	-.1423168***	.0364067	-.2136726	-.0709611
n_adults	.0270319***	.0092054	.0089896	.0450743
year	.0412066***	.005338	.0307442	.0516689

	Coefficients	Robust Std. Err.	[95% Conf. Interval]	
_cons	-75.28756***	10.70073	-96.26061	-54.3145
smoking				
ln_income	.1854854***	.0141518	.1577484	.2132224
drinking	.1873716***	.0169666	.1541176	.2206255
employed_hh	.2271663***	.0177343	.1924077	.2619248
_cons	-1.984247***	.0889953	-2.158674	-1.809819

Source: HBS, authors´ calculations.

Note: *10 % significance, ** 5 % significance, *** 1 % significance

Figure 4 show distribution of price elasticity among smoking households. These with lowest cigarette consumption have highest price elasticity (-1.8) and with rising consumption sensitivity to price change from elastic to inelastic. Household with middle consumption has elasticity -1.17 and really heavy smoking households are less sensitive to price change (-0.70). Results confirm our expectation what is clearly visible on figure.

Figure 4 **Variation of price elasticity of household demand for cigarettes across quantiles of consumption**

Source: HBS, authors´ calculations.

4   Conclusion

The main aim of this paper was estimation of price elasticity of demand for cigarettes. Firstly by using Heckman sample selection model we estimated overall

elasticity of Slovak households which was -0.92. Secondly, to find out how price elasticity vary across households with different level of cigarettes consumption we use quantile regression. From the results we can confirm, that households with light cigarettes consumption are more sensitive to price change than moderate and heavy smoking households. Therefore, taxation as a main instrument can be used for decreasing of light smoking, but this policy should be supported by other tools, mainly to persuade heavy smoking household to quit. For analysis were used HBS data from 2006 to 2012. During this period has smoking in Slovakia declining trend what we find out from Eurobarometer reports and from our data too. We also noticed that later (from 2014) this trend has turned. Why this happened and how price elasticity changed we plan to investigate in the future.

Acknowledgements

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SLOVAK WINE EXPORTS – DETERMINANTS AND COMPETITIVENESS

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Abstract

From 2004, the Slovak wine export is growing on average. Because of that, it is important to analyse the factors determining its successfulness in international market. The objective of this article is to identify the determinants of Slovak wine export, and to determine the trade competitiveness of Slovak wine. The results show that the growth of wine consumption per capita of the importing country has a positive effect on the Slovak wine exports. We also found that Slovak wine exporters tend to trade more with countries with different sized economies such as Germany, USA, United Kingdom, China and Japan. Surprising is that Slovak wines were considered inferior goods by foreign consumers. Moreover, RCA and RTA calculation results point to the fact that during the selected time period, Slovakia had a comparative disadvantage in wine. We did not find any evidence of impact of EU and EMU membership or FTAs signed by the Slovak Republic on the value of exported wine.

Keywords: *foreign trade, export determinants, gravity model, competitiveness, wine*

JEL classification: *Q17, F14, C23*

1   Introduction

Slovakia is a relatively small producer of wine; domestic production represents only about 0.2% of production of the European Union. The Slovak wine sector is currently characterised by reduction of domestic production, which fell from 515 500 hl in marketing year 2003/2004 to 309 700 hl in 2016/2017. This situation and relative stable domestic per capita wine consumption (approx. 13.8 l) causes

the wine imports to grow in average. The share of imported wines on Slovak total supply of wine increased from 29% (2003/2004) to around 65% (2016/2017). Another interesting characteristic of the sector is that Slovak consumers prefer table wines, but domestic production is mainly focused on high quality wines. As demand for domestic production is relatively small, part of the production is exported abroad. The value of exported wine is growing on average. The highest growth rate of wine exports was recorded in the first years after Slovakia's EU accession, and it was slowed down during the financial crisis period. The share of exported wine from the amount of domestic wine produced is very high in Slovakia. From 2015 till 2017, as much as 64% of domestic wine production in average was exported annually. (Database of Statistical office of the Slovak Republic)

During the period 2004-2014, Slovak wine was exported into 52 countries (Figure 1). A significant share of exports was carried out to European countries (e.g. Czech Republic, Germany, Hungary, Ukraine, Romania), but mainly to Czech Republic (85% of all exports). 2.1% of export volume was oriented to Asian countries (e.g. China, Japan, Vietnam), and Slovak wine was also traded to different American, African and Australian countries (e.g. US, Canada, Benin, Egypt, Australia and others).

Figure 1 **Geographic orientation of Slovak wine exports (2004-2014)**

Note: Importing countries are coloured grey.
Source: Own calculation based on INTRASTAT Slovak Republic.

The decision to sell wine to foreign markets should be made with respect to characteristics of these markets. One method of identifying the factors stimulating foreign trade is the gravity model. Most studies using gravity model deal with the simulation of total foreign trade of countries. A smaller number of studies is focused on foreign trade of specific commodities such as wine. For example,

study of Pinilla and Serrano (2012) highlights the role of trade policies in determination of Spanish table wine export possibilities; Balogh (2017) examined global wine trade flows and concluded that common cultural relations and trade agreements between trading partners lower the cost of wine export. Koutroupi, Natos, and Karelakis (2014) analysed the competitiveness of Greek wines in the European market. According to them, the key factors of business success are the level of consumption per capita in the EU countries, the existence of common borders and use of a common language among trading countries, and geographical range of mutual trading partners. One of the gravity model's basic variables, the distance between trade partners, is considered to be a trade barrier (Chang, Polachek, & Robst, 2004; Castillo, Villanueva, & Garcia-Cortijo, 2016). However, Dal Bianco, Boatto, Caracciolo, and Santeramo (2014) found out that the effect of distance is not as strong in the wine sector as in other sectors. It is because wine has a long shelf life, and therefore, it does not create additional variable costs related to product's delivery speed. Imported wines cannot be fully substituted, and consequently, the distant importers do not substitute wines imported from distant markets with wines of close business partners. Interesting results gives the study of Lombardi, Dal Bianco, Freda, Caracciolo, and Cembalo (2016). They assessed intra-EU flows of world's major wine exporters: Italy, France and Spain. According the study, the negative impact of distance was grater in case of bulk wine as in case of bottled wine.

In addition to determinants mentioned above, also agricultural policies are considered a factor influencing exports. Slovakia and other EU members are signatories of many free (FTA) and regional (RTA) trade agreements. The FTAs can be used to negotiate a reduction of tariff and non-tariff barriers (Wesselink & Boschma, 2012; Dijoux, 2017), they can be employed by countries to create competitive advantages for their export of goods. However, the recent studies do not provide unambiguous evidence on positive effects of the free trade agreements on trade stimulation; as in case of Soloaga and Wintersb (2001), who investigated the potential of FTA between EU and EFTA. Hatab, Romstad, and Huo (2010) estimated the effect of RTA on Egypt's agricultural export and found out that the RTA variable was not significant but positive. Thus, the fact that a country is a member of RTA with Egypt did not influence its export volume. Eger (2004) states that FTAs are not expected to have a short-term effect on trade volumes, but in the long run.

2 Data and Methods

2.1 Analysis of export determinants using the gravity model

The gravity model is used for modelling the allocation of traded goods transmitted from the export country (*i*) to the destination (importing) countries (*j*). The objective of this article is to identify the determinants of Slovak wine export in period of 2004-2014 using the gravity model approach, and to determine the trade competitiveness of Slovak wine. In this period, Slovak wine was globally exported into 52 countries. After elimination of outliers (countries, where export occurred only once), we got a data set consisting of observations for 42 countries. As a base for identifying of export determinants, we use model developed by Carlucci, De Blasi, Santeramo, and Seccia (2008):

$$\ln Exp_{jt} = \alpha_0 + \alpha.\ln Prod_{it} + \beta.\ln PcGDP_{jt} + \gamma.\ln Pop_{jt} + \delta.\ln Dist_j + \lambda.kGroup_k + \varepsilon_{jt} \qquad (1)$$

Where: Exp_{jt} – value of Italian wine exports to country *j* in year *t* in EUR (constant prices)

α_0 – constant term

$Prod_{it}$ – production of Italian quality wine in year *t* in hl

$PcGDP_{jt}$ – GDP per capita of importing country *j* in year *t* in USD (constant prices)

Pop_{jt} – population of importing country *j* in year *t* in mil. of inhabitants

$Dist_j$ – distance between importing country *j* and the exporting country *i* (Italy) in km

$Group_k$ – dummy variable, which takes the value 1 if country *j* belongs to group *κ*

ε_{jt} – error term

We extend model (1) by including other variables, which are expected to influence Slovak wine exports. To identify the relationship of dependent variable and independent variables, we estimate several models, and then, we select the best fitting model according criteria described later in this paper.

The gravity equation has logarithmic form. In a particular year, dependent variable (value of Slovak wine export) can reach also zero values, but logarithm of 0 is not mathematically defined. One way to solve this problem is to add the constant 1 ($Exp_{jt}+1$) to all values of dependent variable; such model remains balanced. The second method assumes omitting all observations with zero dependent variable, $Exp_{jt} \neq 0$, (Koren & Tenreyro, 2005). Hence, an unbalanced model is created.

The first estimated model (balanced model A) is a simple extension of classic linear regression analysis to a panel data model, i.e. pooled regression model. It is an estimation method, where the heterogeneity of countries is not identified. The equation for model A is following:

$$\ln Exp_{jt} = \alpha_0 + \alpha.\ln Prod_{it} + \beta.\ln PcGDP_{jt} + \gamma.\ln Pop_{jt} + \delta.\ln Cons_{jt} + \zeta\ln Dist_j + \eta.\ln RFE_{jt} \qquad (2)$$

$$+ \theta.\ln SIM_{jt} + \lambda_1.EU_{jt} + \lambda_2.OECD_{jt} + \lambda_3.WTO_{jt} + \lambda_4.Curr_{jt} + \lambda_5.FTA_{jt} + \lambda_6 Hist_j + \lambda_7.Bord_j$$

$$+ \lambda_8.Lang_j + \varepsilon_{jt}$$

Where: Exp_{jt} – value of Slovak (i) wine exports to importing country j in year t in EUR (constant prices)

α_0 – constant term

$Prod_{it}$ – production of Slovak wine in year t in 1000 hl

$PcGDP_{jt}$ – GDP per capita of importing country j in year t in USD (constant prices)

Pop_{jt} – population of importing country j in year t in mil. of inhabitants

$Cons_{jt}$ – consumption per capita of importing country j in year t in litres

$Dist_j$ – distance between importing country j and the exporting country i in km

RFE_{jt} – relative factor endowments between the trading countries i and j

SIM_{jt} – similarity index of the trading countries i and j

EU_{jt}, $OECD_{jt}$, WTO_{jt} – dummy variable, which takes the value 1 if a country pair ij belongs to these organizations

$Curr_{jt}$ – dummy variable, which takes the value 1 if a country pair ij has a common currency

FTA_{jt} – dummy variable, which takes the value 1 if the country pair ij has a signed free trade agreement

$Hist_j$ – dummy variable, which takes the value 1 if a country pair ij has a common territorial history

$Bord_j$ – dummy variable, which takes the value 1 if a country pair ij has a common state border

$Lang_j$ – dummy variable, which takes the value 1 if a country pair ij has a common language base

ε_{jt} – error term

$\alpha - \eta$; $\lambda_1 - \lambda_8$ – sensitivity change of the dependent variable to changes in independent variables.

The second estimated model (mode B) is unbalanced pooled regression model with the same equation as for model A (2).

According to studies done on the topic of international trade, e.g. De Blasi, Seccia, Carlucci, and Santeramo (2007), to capture unobserved heterogeneity, it is suggested to consider adding fixed effects into the panel model. Here, country-specific effects or time effects can be considered. These effects could have a fixed or a random characteristic. The Hausman test was performed to define whether the supposed effects are random or fixed. A presence of fixed effects in the panel data was determined. For this reason, we estimate also models C-F with fixed effects. The balanced model C and the unbalanced model D include country-specific fixed effects. As non-time varying variables cannot be estimated in model with country-specific fixed effects, variables common language base, common territorial history, common state borders and distance between trade partners have to be excluded from models C and D.

Models E (balanced) and F (unbalanced) include both country-specific and time fixed effects. Because of the presence of time-specific fixed effects, also non-country varying variables (as is the production of country i) have to be excluded from the models.

All fixed-effects models are estimated by OLS, and dummy variables for all partner countries and years (LSDV) are included. The best fitted model is selected by comparing the following characteristics (König & Schulze, 2008):

- measure of adjusted R-squared coefficient, i.e. the higher is the coefficient, the more variability in dependent variable is explained through the model,
- Mean square error (MSE), where the better model is the one with lower MSE,
- Akaike information criterion (AIC), where the better is the model with the lower AIC.

Description of variables

In this chapter, we characterised variables selected to explain the development of Slovak wine exports. Independent variables were selected in accordance with the results of related studies considering the current situation in the Slovak wine market.

Due to the orientation of Slovak consumers on table wines, which are mostly imported, we assume that changes in domestic wine production affect the size of its export. Therefore, we estimate the impact of variable *production* in this paper. *GDP per capita* of importing country represents the income elasticity of foreign demand for Slovak wine. We expect that an increase in income of importing countries affects the size of Slovak wine export positively. We also expect a positive effect of increase in population and increase in wine consumption of these countries on Slovak wine exports. Regarding the variable *distance*, trade theory largely assumes that distance between business partners influences trade among countries negatively. On the other hand, the strength of this relation may

be limited due to the type of commodity traded, as reported by some studies. Other variables with an expected influence on the Slovak wine export are *common territorial history*, *common national borders* and *common language elements* of trading countries, *common currency* and *country membership in international organizations*. We want to determine whether these factors influence the Slovak wine export positively, and therefore, which countries it is advantageous for Slovak exporters to focus on. Indexes *RFE* and *SIM* represent the rate of economic similarity between the export country and import countries. RFE coefficient is a proxy for the level of country's equipment with production factors. If RFE has the value of 0, country *i* and country *j* show the same level of equipment with production factors. The higher the RFE, the greater is also the difference in country's equipment with production factors. We assume that the differences in production factors' equipment motivate countries to mutual trade. For calculating RFE, we use the equation by Baltagi, Egger, and Pfaffermayr (2003):

$$RFE_{ijt} = \left| lnPcGDP_{it} - lnPcGDP_{jt} \right| \quad (3)$$

SIM index determines the similarity between *i* and *j* in size of their economy measured by GDP (Kabir & Salim, 2010):

$$SIM_{ijt} = 1 - \left(\frac{lnGDP_i}{ln(GDP_i + GDP_j)} \right)^2 - \left(\frac{lnGDP_j}{ln(GDP_i + GDP_j)} \right)^2 \quad (4)$$

SIM index takes values from 0 to 0.5, where the value of 0.5 means that the size of the trading countries' economy is the same, and 0 indicates the absolute difference in the size of economy. *FTA* represents the free trade agreements between countries that signed such agreement. Considering the results of some studies, we expect a slightly positive sign of the FTA coefficient, which would mean that Slovak wine exports between the member states improved.

The source of data on population of each country and its GDP is the World bank database. Wine consumption per capita of importing countries is drawn from data portal Wineinstitute.org. Distance between Slovakia and importing countries was calculated based on the air distance within their capital cities. Data on the Slovak wine production is obtained from Eurostat, and data on value of the Slovak wine exports from INTRASTAT database of the Slovak Republic. The list of FTAs is obtained from RTA database of the World trade organization.

2.2 Analysis of Slovakia's competitiveness in wine

As mentioned in the Introduction chapter, most of Slovak wine exports (more than 95%) is carried out to European countries. Therefore, the competitiveness of Slovak wine exports will be identified relative to the corresponding export

performance of European countries. The Slovak wine competitiveness in European agri-food market in period of 2004-2014 is in this paper determined using the relative trade advantage (*RTA*) index introduced by Vollrath (1991). RTA is calculated as a difference between relative export comparative advantage (*RCA*) introduced by Balassa (1965) and relative import comparative advantage (*RMA*):

$$RTA = RCA - RMA \text{ (5)}$$

$$RCA = (X_{ij} / X_{it}) / (X_{nj} / X_{nt})$$

$$RMA = (M_{ij} / M_{it}) / (M_{nj} / M_{nt})$$

where:

X_{ij} – export of product *j* of country *i*
X_{it} – total export of country *i*
X_{nj} – export of product *j* of reference group of countries *n*
X_{nt} – total export of reference group of countries *n*
M_{nj} – import of product *j* of country *i*
M_{it} – total import of country *i*
M_{nj} – import of product *j* of reference group of countries *n*
M_{nt} – total import of reference group of countries *n*
t – agri-food commodities
n – EU-28 countries

RCA measures Slovak wine exports relative to its total agri-food exports and to the corresponding export performance of EU-28 countries representing the most important trade partners of Slovakia. It applies that if RCA1>1, then Slovakia has a comparative advantage in wine export on the international market. If RCA1<1 Slovakia is not competitive, it has not a comparative advantage in wine export. If RTA>0, Slovakia has a relative comparative trade advantage in wine, and if RTA<0, there is no relative comparative trade advantage.

3   Results and Discussion

As mentioned in the Methodology, we estimated 6 models, which under different conditions describe the relationship between the Slovak wine exports in the period of 2004-2014 and factors affecting its value. In Table 1 we summarise the characteristics of estimated models, and we list the order according their suitability to explain the variability of dependent variable.

Table 1 **Comparison of estimated models according to selected criteria**

model	type*	rank	AIC	adj. R^2	MSE
A	bal (pooled)	6	291.808	25.824	17.493
B	unbal (pooled)	3	202.237	33.585	7.143
C	bal (country FE)	5	268.096	41.513	13.800
D	unbal (country FE)	2	132.113	67.060	3.543
E	bal (country, time FE)	4	267.434	41.839	13.709
F	unbal (country, time FE)	1	127.378	68.584	3.379

*bal – balanced model
unbal – unbalanced model
FE – fixed-effects model
Source: Own calculation.

We can conclude that unbalanced models are more suitable to describe variability of our dependent variable. The best model is the unbalanced model F with fixed effects, which consist of both country-specific and time-specific effects. Based on the value of adjusted determination coefficient's we can say that the model and selected determinants explain variability of dependent variable to 68.44%. The Durbin-Watson statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in the data file. Since the P-value is greater than 0.05, there is no indication of serial autocorrelation in the residuals at the 95.0% confidence level. With exception of 4 coefficients, the coefficients of country-specific fixed effects are significant at the 99.0% confidence level. The estimation results of model F (5) are shown in the table below[1]:

$$lnExp_{jt} = 56.1874 - 3.7408 lnPcGDP_{jt} - 4.0381 lnPop_{jt} + 2.5889 lnCons_{jt} \qquad (6)$$

$$-0.2794 lnRFE_{jt} - 6.0126 lnSIM_{jt} + 1.7969\ EU + 3.2888 OECD_{jt} - 2.071 WTO_{jt}$$

$$-0.6433 FTA_{jt}$$

Table 2 **Regression results, best fitting model F**

Parameter	Estimate	Standard Error	T Statistic	P-Value	Significant
Constant	56.1874	16.6479	3.3751	0.0009	***

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[1] oefficients of the fixed effects are omitted. In the equation 7, a simplified model is presented (the most insignificant variables were eliminated from the model).

Parameter	Estimate	Standard Error	T Statistic	P-Value	Significant
GDP per capita	-3.7408	1.8232	-2.0518	0.0419	**
Consumption	2.5889	0.6692	3.8690	0.0002	***
Population	-4.0381	1.3487	-2.9942	0.0032	***
RFE	-0.2794	0.2347	-1.1905	0.2357	
SIM	-6.0126	1.8316	-3.2827	0.0013	***
EU	1.7969	1.5759	1.1402	0.2560	
OECD	3.2888	2.7608	1.1913	0.2354	
WTO	-2.0710	1.1643	-1.7787	0.0773	*
FTA	-0.6433	0.9955	-0.6462	0.5191	
R-squared = 77.3068 percent R-squared (adjusted for d.f.) = 68.4399 percent Standard error of est. = 1.84233 Mean absolute error = 1.14152 Durbin-Watson statistic = 2.06349 (P=0.6771) Lag 1 residual autocorrelation = -0.0317808 Significant: *** at 1%; ** at 5%; * at 10%					

Source: Own calculation.

GDP per capita represents the income elasticity of foreign demand for the Slovak wine. The estimated coefficient of the variable is significant at a significance level of 95%; we can say that one percent increase in GDP per capita of importing country would cause a decline in the value of Slovak wine exports by 3.74%, ceteris paribus. Thus, foreign consumers perceive Slovak wines as inferior goods. This could be related to further result that even the increase in the population of importing countries had not have a positive impact on the Slovak wine exports value. Compared to our assumptions, this fact is surprising. An explanation could be that that in bigger countries, there is usually a wider range of wine products which people can choose from, and it is likely that foreign consumers preferred other than Slovak wines more.

Based on the estimation we can say that an increase in wine consumption per capita of importing countries increased the value of wine exports from Slovakia.

In 2004, there was a relatively large expansion of the European Union. The expectation was that this situation would affect Slovak wine exports positively. However, the results show that the EU membership of Slovak trade partners did not affect the changes in Slovak wine exports significantly. Moreover, the variable common currency in the European Monetary Union (*Curr*) was finally eliminated from the model due to the high insignificancy of its coefficient.

We can say that at the 90.0% confidence level, the fact that the trading partners (*i* and *j*) are members in the WTO, did not influence the Slovak wine exports positively. Comparable results were determined also in the study of Lissovolik and Lissovolik (2004). According to them, some of the exporting countries tend to export more to non-WTO countries than to WTO countries. However, to be able to explain these facts better, it is needed to explore the issue further and in more detail.

RFE index indicating the level of country's *i* and *j* equipment with factors of production is not significant. On the contrary, the index of similarity is highly significant; thus, the differences in size of the Slovak economy and economies of its trading partners encouraged the Slovak wine exports. Countries that in terms of economy size differ from Slovakia the most are the US, Japan, Germany, China, Malta, France and the United Kingdom. Empirical data in the observed period confirm results of the estimated model, where the value of exports to mentioned countries exceeded the value of exports to countries with similarity index close to 0.5 (except for the Czech Republic, which in this case is considered an outlier).

Given the fact that the most suitable model to describe relationship between the dependent and independent variables is the model with both country-specific and time-specific fixed effects, it was not possible to examine the effect of time and country non-varying variables: common language base, shared territorial history, common national borders and distance between trading partners and Slovakia.

Next, we determined the performance of Slovak wine export relative to other European countries. Table 3 shows the calculated values of RCA and RTA index during the selected time period 2004-2014.

Table 3 **Calculated values of RCA and RTA index for Slovak wine exports**

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	over-allav-erage
RCA	0.12	0.09	0.11	0.23	0.18	0.14	0.11	0.16	0.11	0.10	0.14	0.13
RTA	-0.21	-0.25	-0.32	-0.27	-0.33	-0.96	-0.56	-0.59	-0.36	-0.54	-0.64	-0.41

Source: Own calculation based on Eurostat data.

RCA and RTA index point out to the fact that in the examined period Slovakia had neither comparative advantage or relative comparative advantage in wine on the European market. Both indexes had negative development in average. This result is expected as it is in line with result for trade performance

4 Conclusion

The aim of this paper was to is to identify the determinants of Slovak wine export to 42 countries worldwide in period of 2004-2014 using the gravity model approach, and to determine the competitiveness of Slovak wine in the European market.

As expected, the growth of wine consumption per capita of the importing country has resulted to an increase of the Slovak wine exports. This means that for Slovak exporters it is necessary to monitor the preferences of foreign consumers and to focus on markets that have the potential to absorb the additional supply. Surprising is the result that Slovak wines are considered inferior goods by foreign consumers. It is likely that countries, where the income per capita grew faster, would gradually reduce the consumption of Slovak wines. Therefore, it is preferable to direct the wine exports to countries with stable incomes than to faster growing economies. Moreover, RCA and RTA calculation results point to the fact that during the selected time period, Slovakia had a comparative dis-advantage in wine. Because of that, Slovak wine producers should look for ways how to make the wine product more attractive in eyes of foreign consumers, or how to increase its added value. But also important it is to stimulate the interest of domestic wine consumers with choice of appropriate marketing tools: through the organization of wine roads and wine tourism globally, tastings and through trying to win awards at national and international exhibitions, what would present the product positively.

Using the best model estimated, we were unable to identify a significant impact of membership in the EU and EMU on the value of exported wine. We also found that Slovak wine exporters tend to trade more with countries with different sized economies such as Germany, USA, United Kingdom, China and Japan. We did not find any evidence of impact of free trade agreements signed by the Slovak Republic on the value of wine exported to member states. The reason may be that the period was too short for the FTAs effect to manifest itself.

Acknowledgements

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FACTORS INFLUENCING RESPONDENT'S WILLINGNESS TO PAY ENVIRONMENTAL TAX

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Abstract

Environmental issues are very popular these days, and people tend to behave responsible in relation to nature and environment. This tendency leads to ecological lifestyle producing less waste and to using "green" technologies. One from the tools of state policy to influence quality of environment is environmental tax. There is a question, if the people´s tendency to behave environmentally responsible also leads to their inclination to pay environmental tax. Willingness to pay environmental tax can be therefore considered as the measure of environmental preference and trust in the efficiency of government system and its ability to protect environment. The main objective of presented paper is to identify main indicators influencing tendency to pay environmental tax. Source of the analyzed data was European value study conducted in Bulgaria, Cyprus, Germany, Finland, Hungary, Italy, Poland, Romania, Sweden and Slovenia in the period of years from 2010 to 2015. Database contains 2800 observations. Method used to identification of the main factors influencing respondent´s willingness to pay environmental taxes was binary logit model. If respondent would be able to give up part of their income to protect environment, dependent variable was equal to 1, if they answer was negative, dependent variable was equal to 0. As the explanatory variables in the model were used possible factors influencing they willingness to pay environmental tax, such as: their support of awareness about environmental protection and taxes, trust in governments ability to protect environment, gender, age, if they have children or not, education, social class, trust in government, trust in environmental organizations, trust in the European union, religion and employment. Estimated model was evaluated using percentage of correct predictions and likelihood test. Influence of significant factors

was evaluated using odds ratios derived from the final model. Results suggests, that highest influence on the tendency of people to pay environmental taxes have following factors: respondent´s support of awareness about environmental protection and taxes, trust in governments ability to protect environment, trust in environmental organizations, trust in the European union, education and religion. First mentioned factor is strongly connected with environmental responsibility of respondent. Therefore, it is logical its highest influence (odds ratio 17,46). Except for this factor had the highest influence education (odds ratio 1,23) of respondent and his trust to environmental organizations (odds ratio 1,22).

Keywords: *binary logit, environmental preference,environmental tax,*

JEL classification: *C25, C51, H23, R11*

1   Introduction

Environmental issues became very popular these days, especially due to increasing rate of economic growth. Many people declare their interest in environmental problems and protection of the environment. Due to many controversial ecological indicators, it took a long time to find reliable tool to measure level of sustainable development (Hanova and Prokeinova 2008). On the other side, current environmental conditions do not suggest, that people really follow their declared preferences. One way how to measure real individual environmental preferences is willingness of people to support environmental protection financially. Data coming from World Value Survey, European Value Survey and International Social Research Programme allows to investigate individual support of environmental protection and its comparison. Respondents were asked questions about their willingness to financial support of environmental protection and prevention of environmental pollution. These data can be used as the estimate of marginal willingness to pay for environmental protection. In general, factors which has the potential to influence environmental preferences can be classified into two broad categories: individual specifics and specifics at country level.

Objective of prior studies was to analyse determinants of individual financial support of environmental protection and to investigate its relationship with environmental tax reform. The question is, how the fulfilment of environmental objectives influences the extent of meeting economic policy targets. On the other side, environmental tax reform influences also individual behaviour and affects prices of non-market natural materials and increases the cost of activities polluting environment (Ercolano et al. 2013).

According to many authors (Auci et al. 2006, Torgler and Garcia-Valinas 2007, Franzen and Meyer 2010), main factors influencing individual environmental preferences are income, age, gender, education and employment. Positive correlation was identified between tendency to financial support of environmental protection, education, and income of respondents (Kollmann et al. 2012).

On the other side, factors age and gender are controversial in case of analysis including also geographic factor (Torgler and Garcia – Valinas 2007, Olofsson and Ohman 2006, Kollmann et al. 2012).

Environmental preferences are also strongly correlated with political attitudes. Political affiliation, interest in political discussion, identification with political ideology and political party should be taken also into account in the analysis of environmental preferences (Witzke and Urfei 2001).

Other considered variables measuring individual social capital, which influence tendency to support financially environmental protection, are attitude to tax evasion (Auci et al. 2006), trust in government (Dorsch 2011) and membership in volunteer organization (Torgler and Garcia-Valinas 2007). According to Greeley (2007) is important indicator of civic values also factor of religion. Identification with certain religion, and with certain local or global community and its perception of the environment is also important factors influencing individual preferences.

Tendency to financial support of environmental protection is higher, when people see themselves as active citizens who perceive surrounding world and people with pessimistic attitude and sensitivity to environmental risk (Dorsh 2011, Kollmann et al. 2012).

Prior econometric models usually incorporate also geographical location of respondents, index of wealth (Franzen and Meyer 2010), rate of corruption, institutional quality and tax pressure (Auci et al. 2006). Many authors used also variables related to state of the environment, such as index of sustainability (Franzen and Meyer 2010), level of air pollution in household (Auci et al. 2006), level of noise and waste (Witzke a Urfei 2001), index of environmental protection (Dorsh 2011). From the methodological point of view were results obtained by logistic regression, which allows for variable variation (Ercolano et al. 2013).

The main objective of the presented paper is identification of the main factors influencing willingness of respondents to financial support of environmental protection and their willingness to pay environmental tax. These factors were determined first in the pooled set of data and later were investigated regional specifics in the investigated countries.

2 Data and Methods

Data used in the estimated model comes from Eurostat (Environmental tax) and European value survey (individual preferences) which took place in period of years 2010-2015. Survey database includes information about 2800 respondents. In the analysed period were included in the survey 10 countries: Bulgaria, Cyprus, Germany, Finland, Hungary, Italy, Poland, Romania, Sweden and Slovenia. Estimated model includes following variables:

- prefET -Would you give up part of your income to protect environment in form of environmental tax? (0-no, 1-yes) -dependent variable
- infET – do you agree with increasing awareness about environmental taxes to protect environment? (0-no, 1-yes)
- government – should government decrease environmental pollution without decreasing your income? (0-no, 1-yes)
- gender – 0- female, 1-male
- age – 1-18 to 29 years, 2-30-49 years, 3- 50 and more years
- children – 0 do not have children, 1-have at least one child
- education – 1-basic, 2-highschool, 3-university education
- social class – 1-lowest 2-lower middle class, 3-middle class, 4-higher middle class, 5-high society
- trust in Gov – do you trust your government? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Trust EO – Do you trust Environmental Organizations? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Trust EU – Do you trust European Union? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Religion – Is religion important to you? (0-definitely not, 1 – rather not, 2- rather yes, 3-certainly yes)
- Employment - factor included using 3 dummy variables, D1=1 if retired, D2=1 if student, D3=1 if employed, if D1,D2,D3 are equal to 0 denotes unemployed people.

Model

If the Y is a binary response variable equal to 1 when the attribute is present and 0 if it is not present in observation. If $x=(x_1,x_2,x_3....x_k)$ is a set of explanatory variables which can be discrete, continuous or a combination. Binary dependent variable was prefET (1 if respondent would like to support environmental protection financially, otherwise 0), other factors described above were considered as the explanatory variables (Menard 2018)

Logistic regression model presents conditional probabilities (log odds) through a linear function of the predictors expressed as:

$$ln \frac{P(y_i = 1)}{P(y_i = 0)} = \beta_0 + x_i^T \beta = I_i \ (1)$$

Where $\beta = (\beta_1, \beta_2, \ldots \beta_k)^T$ is the estimated vector of k predictor coefficients. Vector of parameters β is estimated using maximum likelihood method. Following likelihood function is maximized:

$$ln[L(\beta)] = \sum_{i=1}^{n} y_i ln \frac{exp(I_i)}{1 + exp(I_i)} + (1 - y_i)ln \frac{1}{1 + exp(I_i)} = \sum_{i=1}^{n} \langle y_i I_i - ln[1 + exp(I_i)] \rangle \ (2)$$

Then predicted probability can be expressed as follows:

$$F_i(I_i) = P(y_i = 1) = \frac{exp(I_i)}{1 + exp(I_i)} \ (3)$$

It is difficult to relate estimated parameters value directly with the outcome. Better way how to explain influence of explanatory variables on the outcome, is the interpretation of the odds ratio rather than estimated parameters of logistic regression. Odd ratio is Euler number raised to value of the estimated coefficient of logistic regression.

$$Odds \ Ratio_j = e^{Bj} \ (4)$$

If the odds ratio of the explanatory variable is higher than 1, it means that increasing of explanatory variable will increase also odds in favor of positive outcome. On the other side, if the odds ratio is smaller than 1, increasing value of explanatory variable will decrease chance of positive outcome.

In case of logistic regression is no more necessary to hold the assumptions of classical linear econometric model based on ordinary least square. Linear relationship between dependent and independent variables, explained variables and error term does not need to be normally distributed. Logistic regression also does not need variances to be homoscedastic and can handle also nominal or ordinal data as explanatory variables. Models were estimated using SAS 9.4.

3   Results and Discussion

Binary logit model was estimated using the data coming from European value survey. Basic indicators of model quality were McFadden R-Squared and number of correct predictions. Due to nature of dependent variables was McFadden pseudo R-square value 0,28 which suggest excellent model fit. (Interpretation of McFadden R-square is different from classical R-square known from OLS, in this case are expected lower values due to nature of dependent variable). Accuracy of

the model measured by correct predictions was 78,7%, which also suggest good prediction ability of the model. Model was evaluated as significant and appropriate to describe suggested relationship among variables. It means, that most of the estimated model parameters are significantly different from zero (p-value 0,0000). In table 1 are shown the factors which affects significantly tendency of respondents to financial support environmental protection.

Table 1 **Estimated logit model**

variable	pvalue	slope at mean	coefficient	odds ratio	significance
Intercept	<0,0001		-1,82		***
InfET	<0,0001	0,52	2,86	17,46	***
government	<0,0001	-0,16	-0,70	0,50	***
gender	0,29	-0,02	-0,11	0,90	
age	0,17	0,03	0,12	1,13	
children	0,51	-0,02	-0,09	0,92	
education	0,00	0,05	0,21	1,23	***
trust in government	0,85	0,00	-0,01	0,99	
trust in EO	0,00	0,05	0,20	1,22	***
trust in EU	0,02	0,03	0,15	1,16	**
religion	0,04	0,02	0,10	1,10	**
social class	0,06	0,03	0,11	1,11	
retirement	0,46	-0,03	-0,13	0,87	
student	0,72	0,02	0,08	1,09	
employee	0,87	-0,01	-0,02	0,98	

Source: Author´s work.

Following factors included in the model were evaluated as significant: InfET, government, education, trust in EO, trust in EU and religion. It means that people who agree with increasing awareness about environmental taxes are also ready to support environmental protection financially. Strength of their conviction correlates with their tendency to financial support. This variable was evaluated as the most significant, it means that people who agree with environmental taxes would probably pay them.

Second important factor was education. With increasing degree of education will people more likely to pay environmental tax. Each level of education will increase odds in favour of paying environmental tax by 23%. More educated

people prefer ecological lifestyle, and have tendency to support environment also financially. Another important variable was trust in environmental organizations. With increasing level of trust in environmental organizations, increased also tendency of respondent´s to support them financially. In this case, if level of environmental organizations support increase by 1, odds in favour of financial support of environment will increase by 22%.

Similar result was recorded also in case of trust in EU. People who trust in EU will be more likely to pay environmental tax. If the level of trust in EU will increase by one, odds in favour of financial contribution will increase by 16%.

Last significant factor, which increase probability in favour of environmental tax is religion. If the self-evaluation of religious preferences increased by 1, it increased also odds in favour of environmental tax by 10%. More religious people will therefore more likely contribute to environmental protection financially. Last variable which was evaluated as significant was the one denoted as government. It included answers to question: should government decrease environmental pollution without decreasing your income? People who replied positively to this question have 50% smaller probability of supporting environment financially. From all the indicators considered in the model, this one was the only factor decreasing the probability of paying environmental tax. All the other indicators included in the model were evaluated as insignificant.

Results interpreted above comes from econometric model, which was estimated using pooled data coming from all European countries included in the survey. This offers general information about factors, which influence environmental preferences of people in the analysed set of countries. On the other side, there are also country specific factors different for each nation. Factors, which were evaluated as insignificant in general result can be significant in the result for individual country. This is caused by cultural and social diversity in Europe.

Individual specifics of investigated countries

Analogical models were estimated for all investigated countries using the same dependent and explanatory variables, as it was in case of pooled model. All the individual models were significant, since p-value testing joint significance of estimated coefficients was less than 0,05. Significance of individual variables was different. This was influenced especially by specific socio-economic and cultural conditions in each analysed country. Estimated odds ratios for individual models can be found in table 2. Odds ratios offers in this case better information than estimated coefficients, due to their direct relation with modelled phenomenon. The odds ratio higher than 1 suggest, that variable support willingness of people

to pay environmental tax, odds ratio smaller than 1 means factor which decrease chance that people will support environment financially.

In all investigated countries was the most significant variable infET, which is in accordance with general model. It is because of strong correlation of this question with dependent variable.

Variable denoted as government, which was respondents' agreement with decreasing environmental pollution by government without decreasing respondents' income, was evaluated in general model as significant with negative effect on dependent variable. In case of individual models for Italy, Poland, Romania and Sweden was parameter of this variable very significant (p-value less than 0,01), in case of Cyprus, Germany and Finland was this parameter significant (p-value less than 0,05). People who agreed with the statement about government in Italy have 90% less odds to contribute to environmental protection financially than people who did not agree. In Finland was this difference only in odds only 55%. On the other side, in Italy and Poland would people support environmental protection financially despite their positive answer to this question.

Table 2 **Estimated odd ratios in individual models for each country**

Variable /country	BG	CY	DE	FI	HU
Intercept	0,025***	0,308	0,924	0,093**	0,346
infET	11,029***	10,689***	25,473***	9,758***	12,815***
government	0,639	0,378**	0,412**	0,449**	0,592
gender	0,81	0,774	0,41***	1,197	1,781
age	1,202	0,927	1,17	1,17	1,21
children	1,015	0,892	0,881	0,851	0,39**
education	1,076	1,038	1,204	1,202***	0,87
TrustGov	0,723	1,49	0,917	1,09	0,848
TrustEO	1,424	1,245	0,852	1,115	1,499
TrustEU	1,099	1,403	0,862	0,692	1,061
religion	1,273	1,192	0,568***	1,166	1,091
social class	1,794**	1,362	1,257	0,975	1,148
retired	1,398	0,429	1,047	0,845	0,889
students	3,778	0,248	0,721	4,026	0,252
employed	2,55**	0,535	0,663	0,789	0,573

Variable /country	IT	PL	RO	SE	SL
Intercept	0,066	0,87	0,116	0,069	0,085**

Variable /country	IT	PL	RO	SE	SL
infET	29,648***	16,945***	19,441***	7,737***	8,057***
government	0,101***	0,304***	0,149***	0,367***	0,953
gender	1,367	0,429**	0,753	1,244	0,999
age	1,355	0,927	1,123	1,588	1,681
children	0,363**	0,445	1,401	1,562	0,509
education	1,468	0,865	1,744**	1,238	1,249
TrustGov	1,134	1,097	1,202	0,922	0,705
TrustEO	1,827**	1,12	1,163	1,153	1,281
TrustEU	1,313	0,98	1,637**	1,585**	1,214
religion	0,739	1,274	1,193	0,85	1,447**
social class	1,219	1,027	0,69	0,956	1,14
retired	1,279	2,332	0,973	1,224	0,92
students	1,232	2,212	5,079	1,159	1,851
employed	0,761	1,343	1,083	1,268	1,369

Source: Author´s work.

Variable "trust in EU" was strongly significant only in Sweden (p-value less than 0,01) and significant (p-value less than 0,05) in Romania. People who trust European Union has 58% higher chance to pay environmental tax in Sweden and 63% to pay environmental tax in Romania. In Italy was significant also factor "Trust in Environmental Organisations". In this country, people who trust environmental organizations have 82% higher odds in favour to support environment financially.

Factor specific only for Bulgaria was social class. According to estimated model, people who belongs to higher social class have 79% higher odds than others to support environmental protection financially.

Curious result was found in case of Religion. This parameter was significant in Germany and Slovenia. While in Slovenia have religious people 45% higher odds of willingness to pay environmental tax, on the other side, in Germany are religious people less willing to pay environmental tax (odds smaller by 43%).

Education was factor specifically significant in Finland and Romania. In both countries are people with higher education more willing to pay environmental tax. In Romania have people with higher education 74% higher odds in favour of paying environmental tax. In Finland it was only 20% higher odds.

Factor gender was significant only in Germany and Poland. In both cases are women more environmentally oriented gender. In Germany are odds in favour of

paying environmental tax higher in case of women by 41% than in case of men. In Poland was this difference 43%.

Another specific factor influencing willingness to pay environmental tax was Children. This factor was significant only in Hungary and Italy. In both countries are people with children less willing to pay environmental tax. In case of Hungary have people with children 61% smaller odds in favour to pay environmental tax, in Italy it was 63%.

Last factor included in the estimated models as explanatory variable was employment. Suggested model distinguished between students, employed, unemployed and retired people. This variable was significant only in case of Bulgaria. In this country are employed people 2,5 times more willing to pay environmental tax.

4   Conclusion

Proposed paper was focused on the investigation of the factors which influence tendency of people to financial support of environmental protection. The main objective was identification of the most significant factors, and partial objective was identification of factors specific for individual countries. According to result of the model estimated using the data collected in 10 countries for the period 2010-2015 are the most important following factors: individual support of awareness about environmental protection, their agreement with the statement that people should also support financially environmental protection, education, trust in European Union and Environmental organisations and religion. In case of first two factors were result expected, because data correlated with environmental preference of people. According to other variables, people who have tendency to support environmental protection also with their own financial sources are better educated, religious and trust in environmental organisations and European Union. This can be described as the average environmental supporter in ten analysed countries.

Next step of the conducted analysis was the estimation of individual model for each analysed country to investigate country specific factors and to identify differences between countries. The results of individual models suggest, that if people support increasing of awareness about environmental issues, they would also contribute financially to protect environment. This variable was significant in all the estimated models which is expected due to strong correlation of this variable with dependent variable. This was expected also in the case of second variable. This variable was related to question, if government should finance environmental

protection without decreasing individuals' income. Despite of expectations, this variable was not significant in case of Bulgaria, Hungary and Slovenia.

Significance of other variables were different in each analysed country. In case of Bulgaria are environmental preferences influenced especially by economic factors social class and employment. It means that employed people and people from higher social class are more willing to support environment financially. This can be related with economic situation in this country.

In case of Germany was significant only social factors gender and religion. Despite of expectations, result suggest that women and less religious people will have tendency to support environmental tax more. This result is in contrast with Slovenia, where was the only significant factor religion, and estimated odd ratio suggest, that increasing religiosity will increase environmental support. On the other side, significant influence of gender in Germany corresponds to almost the same result in Poland.

The only significant factor in Finland was education. Each level of education will increase odds in favour of environmental protection by 20%. In Romania was the effect of education even stronger (74%). In this country were environmental preferences affected also by trust in EU. This corresponds also with Sweden results. In both countries are environmental preferences strongly related to trust in EU. Result suggest, that supporters of environmental tax are people with stronger trust in EU.

Factor specific for Hungary and Italy were children. Estimated odd ratios suggests that people with children are less willing to support environment financially. It can be related to their economic situation, and with the fact that they probably use these financial sources rather for their children. Another significant factor significantly influencing environmental preferences in Italy was trust in environmental organizations.

Result suggest, that willingness of people to support environment financially is connected in the first place with their environmental preferences. Other factors differ among countries. This is influenced by economic, social and cultural factors specific for each individual country. This should be considered particularly in case of environmental promotion campaign in these countries. Especially in situation, when new environmental taxes are introduced and government wants to increase awareness about environmental protection.

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IDENTIFICATION OF OPTIMAL PRODUCTION STRUCTURES IN MAIZE PRODUCTION AREAS OF THE SLOVAK REPUBLIC AND THE CZECH REPUBLIC UNDER CONDITIONS OF UNCERTAINTY

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Abstract

In this document issues of decision-making process are solved, demonstrated in the case of difficult problems solutions and the most suitable alternatives for personal benefits are determined. This document is focused on conflicting situations with several participants. These situations are called in the game theory games with nature. In general, several models exist, but our intention was to use a model which is typical for games in conditions of uncertainty, where the only opponent of every single subject is the nature with its random effects. The objective is to achieve the highest level of profit with combination of growing types of plants and independent of natures behavior. Slovak territory is diversified and therefore splited into several agricultural subcategories. To assure that results of the analysis are as reliable as possible, we choose one area with more narrow characteristics. We paid attention to corn area of Slovak Republic and Czech Republic. The aim is to compare this production area in two countries based on making optimal seeding structure of plants and maximization of the benefits by using game theories approaches. It means Wald model, Savage model and Agrawal - Heady principle, which are based especially dedicated for linear programming. Using these models, we can interpret also the impact of a possible deviation from the recommended strategy through shadow price and reduced cost. The research used four databases of economic indicators per hectare. The above-mentioned criteria are not only applied for input data of the Slovak

Republic and the Czech Republic, but also for data cleaned from subsidies. The main goal is the comparison between effectiveness of cultivation in the Slovak Republic and the Czech Republic, as well as assesing the impact of subsidies to determine the optimal plan of plant production and obtained benefits.

Keywords: *decision-making, seeding plan, subvention, profit.*

JEL classification: *C61, C72, Q15*

1   Introduction

Producers, which are on competitive market, are looking for possibilities to maximize profit by growing of yield from range (Bezat-Jarzębowska and Rembisz, 2013). Increasing of production contributes to economic growth and thereby to growth of overall economic prosperity. However, in most markets with high GPD per inhabitant, the rate of growth of production in the sector is determined by an increase of low demand. According to Fiegiel and Remimbisz (2013), research confirms that the increase of demand for agri-products that occurs in a certain period also determines the growth of production in agri-food sector. A low rate of growth in demand for agricultural products can limit growth in the agri-food sector. Therefore, must be determined a change in efficiency-based relationships, which is considered as the main growth factor in this sector. The authors suppose that the growth of inputs is not main factor of competitiveness, but the efficiency of using these inputs is the major factor of competitiveness, which is expressed by ability of long-term efficient growth and by performance.

The key to efficiency of the production is the ability of management to respond to new market conditions, objective analysis and evaluation of own possibilities and own results. Also making the right decisions is very important. Identification of an optimal production structure is one of the key issues. Successful solution of these issues is conditional on the economic performance of agricultural business entities. For objectification of solution in case of complex problems solving, various support systems and related information systems are available nowadays. McCown (2002) describes in his publication the development of these systems. Different researches and managers from different areas have changed their way of thinking due to the development of information technologies. He recommends more studying of own history and own roots, which will provide fewer problems and greater success. The knowledge obtained this way, can be still useful for understanding past problems and for reassessing which agricultural models of information systems could be more useful for managing the agricultural plants. Dantzig (1951) mentions in his study a theoretical game model, which can be

used to solve problems in the field of agriculture as well. The model with one criterion is often unsatisfactory and cannot capture the reality of decision making in the theoretical game model. Therefore, is appropriate to use a mix of multiple criteria, like maximizing of the minimum value, minimizing of the greatest loss and maximizing of the minimum batch as Romero and Rehman (2006) are mentioning. For agricultural decision-making models, the most used criterion is maximin Wald, minimax Savage and Agrawal-Heady, which represents a compromise between the previous two.

The article is focused on decision-making in indefinite conditions and on finding an optimal strategy. The optimal strategy in agriculture represents commodity ratio that can ensure efficiency of using the sources and maximal benefit. Opponent of these model games is nature, which creates conditions of indeterminacy. These conditions consist from the fact, that we don't know the probability of behaviour of nature.

2   Data and Methods

The aim of the article is to identify an optimal strategy in determining of the appropriate production structure in the corn region of the Slovak Republic and the Czech Republic under condition of uncertainty and comparison of the obtained results between the Slovak Republic and Czech Republic, without taking into account the subsidies and also with taking into account the subsidies. Corn region is the best area for cultivation of crops because of its conditions. The solution is applied in the theory of games, namely matrix games with nature, using the criteria of the Wald and the Agrawal-Heady.

The Wald criterion ensures the greatest minimum of benefit, regardless of the state of nature. The optimal decision of an intelligent participant in a game is given by a combination of its individual strategies, for which the median of winning or benefits, expressed by formula

$$min(x_1 a_{1j} + x_2 a_{2j} + \ldots + x_m a_{mj}) \text{ for } j=1,2,\ldots,n \text{ (1)}$$

obtains the maximum value and no matter what strategy nature chooses. Here: a_{ij} ($i = 1, 2, \ldots, m$; $j = 1, 2, \ldots, n$) represents benefits (profit per hectare) for the intelligent participant of the game in case of the selection of the i-th strategy and the occurrence of j-th status of nature

elements x_1, x_2, ..., x_m, for which is valid $0 \le x_i \le 1$ $\sum_{i=1}^{m} x_i = 1$ (2) indicates frequency with which an intelligent participant can choose individual strategies A_1, A_2, ..., A_m.

Base of **the Savage criterion** is the principle of mini maximal loss. The optimal decision of intelligent participant will be decision, which protect him from big losses, compared to the decision, which he will made if he knew pure nature strategies. The basis is modified payment matrix, a matrix of losses, which represents loss over the best option in the actual nature status (in the actual year)

$$S = (S_{ij})_m^n \ (3)$$

with elements $s_{ij} = \overset{max}{\underset{k}{}} a_{kj} - a_{ij} \left(k \in \{1,2, \dots, m\}; j = 1,2, \dots, n \right)$ (4)

Elements of matrix S are indicating the amount of loss, which intelligent participant will suffer, if he choose i-th strategy compared to his best choice, in supposition that he know the nature behaviour in advance. An optimal strategy is the strategy where the median of the win expressed by formula

$$\overset{max}{\underset{j}{}} (x_1 s_{1j} + x_2 S_{2j} + \dots + X_m S_{mj}) \text{ for j=1,2,...,n (5)}$$

obtains the minimal value.

The Agrawal-Heady criterion is based on the principle of maximization of minimal profit. Beneficial decision is decision which ensure for intelligent participant maximal profit against worst decision, which he will made if he knew the nature behaviour in advance, so the pure strategies. The basis is the calculation of the profit matrix. Elements of this matrix we obtain by the following: In each column of matrix, we deduct the minimum element from all elements of this column. Therefore, we define a new matrix

$$Z = (Z_{ij})_m^n \ (6)$$

with element $Z_{ij} = a_{ij} \overset{min}{\underset{k}{}} a_{kj} \left(k \in \{1,2, \dots, m\}; j = 1,2, \dots, n \right)$ (7)

Elements of matrix Z are indicating the amount of a profit, which intelligent participant will get, if he choose i-th strategy compared to his worst choice, in supposition that he know the nature behaviour in advance. An optimal strategy is the strategy where the median of the win expressed by formula

$$\overset{min}{\underset{j}{}} (x_1 Z_{1j} + x_2 Z_{2j} + \dots + x_m Z_{mj}) \text{ (for } j = 1,2, \dots, n) \ \ 8$$

obtains the maximal value.

Optimal strategies are identified by using the linear programming model. For model solution, MS Excel is used. Part of MS Excel is program "Solver", which identifies optimal strategies. Data for research are obtained from publications of

own costs and performance results of agricultural plants in Slovak Republic and Czech Republic, in years 2006-2014 for corn region, published by Slovak Research institute of agricultural and agri-food economics (VÚEPP), Czech Institute of agricultural economics and information (ÚZEI) and Ministry of agriculture and rural development of the Slovak Republic (MPRV SR).

3   Results and Discussion

Results consist from interpretation of obtained results, which are focused on appropriate crop sowing structure of each crop and on information resulting from potential changes in the restrictive conditions of individual crops in the corn production region. Because of space constraint, highlighted will be interpretations of commodities, which would bring the greatest changes by departing from optimal percentage representation.

Input data correspond to years 2006 and 2014, which are reflecting the gross profits of commodities for 1 hectare.

Table 1 **Gross profits of selected crops in years 2006 - 2014 in EUR. ha^{-1} without taking into account the subsidies, SR**

REVENUE-VARIABLE COSTS	2006	2007	2008	2009	2010	2011	2012	2013	2014
wheat	109,54	329,91	201,92	-119,81	123,90	213,52	236,90	138,30	189,68
barley	165,34	313,62	224,09	16,26	4,58	310,86	182,01	124,04	138,50
oat	187,01	129,82	-25,49	-96,18	-205,37	46,18	64,93	257,94	8,21
corn for grain	183,83	177,02	181,07	51,46	119,26	491,86	493,86	129,62	171,32
other crops	360,32	667,70	702,38	-58,19	-45,78	-38,47	280,65	350,54	320,87
edible peas	-0,66	61,74	9,00	-228,92	-141,80	146,41	-365,22	-157,49	-84,62
corn for green	32,00	-30,74	-12,75	-126,81	-82,80	-240,48	-137,10	-203,20	-10,45
other one-year feed	97,46	-11,95	-41,46	-32,24	-190,14	-123,72	-9,97	304,56	20,52
multi-annual feed	70,27	61,11	12,85	24,74	4,93	-133,32	-3,60	14,21	59,30
permanent grassland	24,43	-16,03	-54,64	-0,13	-0,06	-33,03	-24,59	-25,75	-16,23
pasture lands	-14,89	-9,25	-6,97	-15,24	-11,24	-3,90	-7,81	-14,22	-15,26
oil-seed rape	256,92	81,79	524,83	-97,97	71,71	406,80	-20,45	431,52	266,67
sugar rape	992,70	722,47	761,00	1165,66	716,80	1558,11	-760,33	-497,76	992,86
grape	-773,09	-860,52	-1131,05	-1487,94	-1589,62	2046,81	87,72	1825,06	330,72
sunflower	27,52	288,12	136,79	-159,98	220,81	378,91	376,00	244,77	35,00

Source: Own data processing from VÚEPP and MPRV SR.

The structural variables of the model represent selected crops of chosen agricultural region. From table 1 is visible which commodities are involved. In the model are expressed only as variables x1 (wheat) - x15 (sunflower). Profit respectively loss; reflect the difference of revenues for 1 hectare and variable costs for 1 hectare of chosen crops without taking into account the subsidies. Model for the Czech Republic is similar, with small change of some crops is visible in table 2. For both countries, to better comparison, model was also quantified with data including subsidies.

Table 2 **Gross profits of selected crops in years 2006 - 2014 in EUR. ha^{-1} without taking into account the subsidies, ČR**

REVENUE-VARIABLE COSTS	2006	2007	2008	2009	2010	2011	2012	2013	2014
winter wheat	7,10	286,03	391,42	-69,51	148,71	358,90	142,38	245,26	301,13
spring wheat	-25,52	38,80	297,28	-69,17	144,63	36,78	200,93	337,70	65,38
rye	35,88	240,20	205,71	-61,70	-55,12	-55,85	98,83	-182,28	107,29
winter barley	58,76	170,79	252,25	-102,38	-16,17	233,61	-95,83	32,33	191,61
spring barley	26,76	234,27	672,12	180,72	114,31	428,92	167,73	415,44	516,60
oat	-25,39	165,82	112,20	246,85	-31,49	250,44	178,76	65,81	19,88
triticale	-45,86	104,00	127,85	-52,39	79,58	102,62	178,37	695,29	601,11
corn for grain	63,01	510,56	504,78	15,46	295,14	552,74	550,30	354,61	220,61
peas	-130,68	-128,90	33,78	-162,87	-154,96	17,55	-21,64	65,81	-107,61
oil-seed rape	175,12	148,35	425,46	87,36	118,58	163,52	186,26	399,57	343,26
poppy	147,17	528,79	746,27	-320,94	75,82	-141,39	460,38	1012,07	842,62
sunflower seed	-102,98	56,89	-9,97	-216,71	-45,67	171,09	153,53	3,43	-117,21
sugar beet	453,98	29,96	38,06	181,97	178,19	777,04	497,29	488,03	396,32
corn for green	-60,19	-111,95	1,14	4,78	-4,81	65,06	-87,20	90,01	80,28
other one-year feed	-102,18	-81,96	-99,26	-172,13	-29,14	-96,63	-86,00	-69,39	-182,96
multi-annual feed	100,06	186,78	187,47	215,00	89,64	50,42	-32,68	44,90	58,99
permanent grassland	84,40	46,76	49,47	28,20	176,56	78,13	15,08	16,67	8,58
other ware potatoes	899,25	521,86	166,17	221,18	271,75	493,22	264,77	87,39	-479,87
hop	-1931,16	994,43	2793,59	1089,78	405,29	360,69	-2393,47	-187,07	652,39

Source: Own data processing from ÚZEI and MPRV SR.

When the Wald criterion is applied on data for SR, linear programming model consist of a function which is representing maximizing of the price of game *v (max v)*, taking into account the limiting conditions, which ensure that the expected hectare profit is (respecting the nature status in monitored years) bigger or minimally the same as the price of the game.

$$2006 : 109,54x_1 + 165,34x_2 + 187,01x_3 + 183,83x_4 + 360,32x_5 + 0,66x_6 + 32x_7 +$$

$$+ 97,46x_8 + 70,27x_9 + 24,43x_{10} - 14,89x_{11} + 256,92x_{12} + 992,7x_{13}$$

$$- 773,09x_{14} + 27,52x_{15} \geq$$

$$2014 : 189,68x_1 + 138,5x_2 + 8,21x_3 + 171,32x_4 + 320,87x_5 + 84,62x_6 - 10,45x_7 +$$

$$+ 20,52x_8 + 59,3x_9 - 16,23x_{10} - 15,26x_{11} + 266,67x_{12} + 992,86x_{13}$$

$$+ 330,72x_{14} + 35x_{15} \geq$$

Similar for years 2007-2013 .

$$\sum_{i=1}^{15} x_i = 1$$

For the more realistic results, which correspond to requirements of animal production, principles of crop plans and to the sales possibilities, the additional restrictive conditions were added to basic restrictive conditions.

Wheat must be planted at least on 28,6% of field, barley should occupy 13% of field or more, oat can´t exceed 0,1% of the total area, corn (for grain) should be sown on maximum 16,6% of field, other grain should occupy a maximum 0,9%, corn (for green) is necessary to have at least on 6,3% of field, other one-year feed can be sown at least on 0,6%, multi-annual feed can´t exceed 8,5%, permanent grassland at least 2,1%, lower limit for pasture lands is 1,5%, oil-seed rape should have a minimum percentage of 8,9%, sugar rape may be maximum 5,5% and sunflower should occupy at least 10% of the area.

With similar procedure is constructed also model for Czech Republic. However, the additional conditions must be adapted to exact area. Based on obtained outputs is possible to compare optimal sowing programmes of Slovak Republic and Czech Republic.

Table 3 **Comparison of optimal sowing plans based on the Wald criterion**

The Wald criterium						
Slovak republic	grants		Czech republic	grants	
	without	with		without	with
wheat	28,60%	28,60%	winter wheat	27,32%	29,80%
barley	12,00%	13,00%	spring wheat	2,48%	0,00%
oat	0,00%	0,00%	rye	0,00%	0,00%
corn for grain	16,60%	16,60%	winter barley	0,00%	13,00%
other crops	0,00%	0,00%	spring barley	13,00%	0,00%
edible peas	0,00%	0,00%	oat	0,10%	0,00%
corn for green	6,30%	6,30%	triticale	0,00%	0,00%
other one-year feed	0,59%	0,59%	corn for grain	16,00%	16,00%
multi-annual feed	7,89%	6,89%	peas	0,00%	0,00%
permanent grassland	2,16%	2,16%	oil-seed rape	8,90%	9,00%
pasture lands	1,47%	1,47%	poppy	1,00%	1,00%
oil-seed rape	8,90%	8,90%	sunflower seed	10,00%	10,00%
sugar rape	5,50%	5,50%	sugar beet	0,69%	2,50%
grape	0,00%	0,00%	corn for green	6,30%	6,30%
sunflower	10,00%	10,00%	other one-year feed	0,59%	0,59%
			multi-annual feed	8,47%	7,65%
			permanent grassland	3,16%	3,16%
			other ware potatoes	1,00%	1,00%
			hop	1,00%	0,00%

Source: Own data processing from ÚZEI, VÚEPP and MPRV SR.

Table 3 shows a comparison of recommended seeding plans by using the Wald criterion. In Slovak Republic, if we don´t consider subsidies, it is not advisable to occupy the area by oats or edible peas. In Czech Republic is not advised oats and

edible peas, but also rye and triticale. If in the Slovak model is included rye, it can be assumed that rye will not get to sowing plan, because of its weak economic stability and triticale as well, because the Slovak data about wheat are including three types of wheat and is not divided as in Czech Republic. Looking to the results for wheat in the Czech Republic and in Slovak Republic, the percentage is only slightly higher for the Czech Republic. In the Slovak Republic is value about 1% lower. Taking into account possible limitations and requirements, on the largest field should be wheat, corn for grain, barley and sunflower in both countries. Comparing to Slovak Republic, in Czech Republic in corn region is more effective to grow poppy, which is very lucrative crop, other ware potatoes or hop.

If we are not taking into account state support, with the Wald criterion and by the optimal production structure in the Slovak Republic will be achieved profit 9,17 EUR per 1 hectare.

With the Wald criterion based on dual prices was found, that the bigger increase of expected profit by 1% of overall area will be because of sugar rape, namely by 11,41 EUR. ha^{-1} and the biggest decrease because of sunflowers for seed, namely by 1,85 EUR. ha^{-1}.|

From the reduced costs it can be assumed that if oats (which not reached this model in corn region) will be grown on 1% of field, the expected profit would decrease by 2,54 EUR. ha^{-1}. Other crops would also bring a negative change to the expected profit, as it could decrease 0,83 EUR. ha^{-1}.

In Czech Republic, the implementation of the Wald strategy will bring a benefit (not taking into account subsidies) of 21,14 EUR. ha^{-1}.

Using the above-mentioned principle, the expected profit in Czech Republic will be affected the most by 1% of potatoes, which would bring an increase by 0,34 EUR. ha^{-1} and sunflower for seed, which would bring decrease of expected profit by 4,11 EUR. ha^{-1}. This is resulting from dual prices.

If in the Czech Republic will be sown edible peas (which is not in optimal solution) on 1% of overall area in corn region, it will cause decrease of maximal profit by 3,47 EUR. ha^{-1}. Also, negative would be sowing of triticale on 1% of area, because expected profit would decrease by 2,37 EUR. ha^{-1}.

Also, with the following results, based on all criteria, is true that if crops which are not in optimal solution, will be in sowing plan, there would be a worsening of the purpose function, that represents in the Wald criterion expected maximal profit, in the Savage criterion minimal loss over the best variant and in the Agrawal-Headey criterion maximal profit over the worst variant, which should happen in conditions of uncertainty.

Table 4 **Comparison of optimal sowing plans based on the Savage criterion**

The Savage criterium						
Slovak republic	**grants**		**Czech republic**		**grants**	
	without	with		without	with
wheat	30,00%	30,00%	winter wheat	30,00%	30,00%
barley	13,00%	13,00%	spring wheat	2,00%	2,00%
oat	0,10%	0,00%	rye	7,35%	7,35%
corn for grain	16,60%	16,60%	winter barley	0,00%	0,00%
other crops	0,90%	0,00%	spring barley	13,00%	13,00%
edible peas	0,31%	2,59%	oat	0,00%	0,00%
corn for green	6,30%	6,30%	triticale	0,00%	0,00%
other one-year feed	1,86%	0,59%	corn for grain	16,60%	16,60%
multi-annual feed	0,00%	0,00%	peas	0,00%	0,00%
permanent grassland	2,16%	2,16%	oil-seed rape	8,90%	8,90%
pasture lands	1,47%	1,47%	poppy	1,10%	1,10%
oil-seed rape	9,70%	9,70%	sunflower seed	10,00%	10,00%
sugar rape	5,50%	5,50%	sugar beet	0,00%	0,00%
grape	1,10%	1,10%	corn for green	6,30%	6,30%
sunflower	11,00%	11,00%	other one-year feed	0,59%	0,59%
			multi-annual feed	0,00%	0,00%
			permanent grassland	3,16%	3,16%
			other ware potatoes	0,00%	0,00%
			hop	1,00%	1,00%

Source: Own data processing from ÚZEI, VÚEPP and MPRV SR.

By using the Savage process of subsidies, multi-year feed in both areas has fallen out from optimal crop production, if we are not taking into account subsidies. The oat is not worth it to grow. In the Czech Republic peas is not in the solution, because it shows high instability and often is in negative values. However, in Slovak Republic is advised by the Savage process in small extent. In the Czech Republic, it is not advisable to grow sugar rape and also not effective is winter barley. Other crops as well on the Czech as well on the Slovak side have very similar percentages. Sunflower is better in the Slovak Republic, also oil rape. On the Czech side, there is a better representation of wheat. In the corn region of the Slovak Republic is good to pay attention to the vineyard and in the Czech Republic especially the poppy and the hops.

By application of the Savage criterion in corn region of Slovak Republic can be expected without subsidies minimal loss 1689,41 EUR. ha^{-1}. By using mentioned principle by additional 1% of area for grain corn could bring decrease of expected loss by 0,71 EUR. ha^{-1} and corn for green could bring increase by 2,61 EUR. ha^{-1}, as dual prices are indicating.

For this criterion in Czech Republic is possible to expect the lowest loss of 2047,32 EUR. ha⁻¹ compared to the best option. Resulting the dual prices in model, for data of the Czech Republic, expected loss could be decreased by another 1% of the hops, by 25,88 EUR. ha⁻¹ and increased by another 1% of field for sunflower, by 7,56 EUR. ha⁻¹.

Table 5 **Comparison of optimal sowing plans based on the Agrawal-Heady criterion**

The Agrawal-Heady criterium						
Slovak republic	**grants**		**Czech republic**		**grants**	
	without	**with**			**without**	**with**
wheat	30,00%	30,00%	winter wheat		27,80%	27,80%
barley	13,00%	13,00%	spring wheat		2,00%	2,00%
oat	0,00%	0,10%	rye		0,00%	0,00%
corn for grain	16,60%	16,60%	winter barley		0,00%	0,00%
other crops	0,90%	0,90%	spring barley		13,00%	13,00%
edible peas	0,00%	0,00%	oat		0,00%	0,00%
corn for green	6,30%	6,30%	triticale		0,00%	0,00%
other one-year feed	0,59%	2,18%	corn for grain		16,60%	16,60%
multi-annual feed	2,69%	0,00%	peas		0,00%	0,00%
permanent grassland	2,16%	2,16%	oil-seed rape		8,90%	8,90%
pasture lands	1,47%	1,47%	poppy		1,00%	1,00%
oil-seed rape	9,70%	9,70%	sunflower seed		10,00%	10,00%
sugar rape	5,50%	5,50%	sugar beet		2,50%	2,50%
grape	1,10%	1,10%	corn for green		6,30%	6,30%
sunflower	10,00%	11,00%	other one-year feed		0,59%	0,59%
			multi-annual feed		0,00%	0,00%
			permanent grassland		9,31%	9,31%
			other ware potatoes		1,00%	1,00%
			hop		1,00%	1,00%

Source: Own data processing from ÚZEI, VÚEPP and MPRV SR.

The Agrawal-Heady expression is not accepting grow of oats and peas. In the Czech Republic, neither multi-annual feeds, rye, winter barley nor triticale is sown. The leading position maintains wheat, followed by spring barley, corn for grain or sunflower. Higher percentages have in this criterion permanent grassland in the Czech Republic. The percentages of oil-seed rape are lower about 1% in the Czech Republic. Potatoes were returned by 1% and sugar rape by 2,5% in Czech Republic. Other plant representation is more or less without any change. Comparing with the Slovak Republic, in the Czech Republic is worth to grow of poppy, potatoes and hops in the corn region, if we are not taking into account subsidies.

The optimal structure based on Agrawal-Heady principle will provide the highest profit against the most inappropriate option 278,95 EUR. ha^{-1} without subsidies in Slovak Republic. Based on the principle, an increase of sugar rape area by 1%, would be expected increase of profit by 9,34 EUR. ha^{-1} and in case of permanent grassland decrease by 0,76 EUR. ha^{-1}.

The maximum profit of 296,98 EUR. ha^{-1} can be ensured by optimal combination of growing in Czech Republic. By increasing of the hops area by 1%, it can be expected increase of profit by 2,29 EUR. ha^{-1} and corn for green decrease by 2,06 EUR. ha^{-1}.

Taking into account the subsidies, using the Wald criterion in the Slovak region led to the increase of barley and the reduction of multi-annual feeds. In the Czech Republic, spring wheat has disappeared, perhaps because of less yield stability than the winter wheat during dry spring. Spring barley, which looks more favourable, was replaced by winter barley. The area of oil-seed rape and sugar rape has increased, because of its economic stability of production. The area for multi-annual feeds should be also reduced. Hops, which is characterized by high fluctuation in economic production, has disappeared from the solution. Representation of other crops did not changed.

In Slovak corn region, the optimal sowing plan would achieve expected maximum profit 101,03 EUR. ha^{-1} by using the first criterion, taking into account subsidies. On the basis of dual pricing, the biggest impact on the expected profit would have an increase of 1% in the area of sugar rape, which would bring an increase of expected profit by 12,84 EUR. ha^{-1}, but an additional 1% of the area of corn for green causes a decrease by 1,96 EUR. ha^{-1}.

By monitoring of the Czech Republic, using the Wald criterion, decision-maker would have profit 297,64 EUR. ha^{-1} using optimal crop structure, with taking into account the subsidies. By using the Wald criterion, the value of expected profit would be mostly affected, if the potatoes expand to another 1% of field, an increase by 7,99 EUR. ha^{-1} would occur. On the other hand, the one-year feeds will decrease by 2,02 EUR. ha^{-1}.

The policy of subsidies in case of the Savage criterion did not significantly change the percentage of individual crops. The impact was visible only for Slovak data, but at minimum level.

In the Slovak Republic area, by optimal sowing plan obtained by using the Savage principle will reach the expected loss corresponding to minimum 1830,86 EUR. ha^{-1} with taking into account the subsidies. Shadow prices are showing, that expanding of growing the sugar rape on additional 1% of area would decrease expected loss by 17, 82 EUR. ha^{-1} and another additional 1% of corn for green will increase expected loss by 4,35 EUR. ha^{-1}.

If the optimal crop structure in corn region of Czech Republic corresponds to the Savage solution, the decision-maker will ensure minimal loss 2409,86 EUR. ha^{-1}. By using this procedure, an increase of hops by 1% would decrease the minimal loss by 25,88 EUR. ha^{-1}. Other one-year feeds would increase expected loss by 3,05 EUR. ha^{-1}, if we are not taking into account subsidies.

Expression of subsidies should not have again aggressive intervention for outputs of individual models, constructed based on the Agrawal-Heady criterion. Also, can be stated that the percentage distribution of commodities did not change. Little differences are making values, which are representing oats, feeds and sunflower in Slovak Republic.

Taking into account the subsidies, applying of this criterion, we can expect the biggest profit against the worst inexplicable variant 399,44 EUR. ha^{-1} in Slovak Republic. Increasing of the area by another 1% for sugar rape can increase expected profit by 16,45 EUR. ha^{-1} and in case of extension of grass field, can be expected decreas by 0,92 EUR. ha^{-1} as resulting from dual prices.

The decision maker in the Czech Republic can expect achieving of the best benefit against the worst option 298,86 EUR. ha^{-1} with taking into account subsidies. The Agrawal-Heady criterion founded that an additional 1% of hops can bring in this case increase by 2,29 EUR. ha^{-1} and other one-year feeds can bring decrease by 2,06 EUR. ha^{-1}.

4   Conclusion

In the presented article, three decision-making criteria were used. Based on that, optimal sowing plans were identified. By using all principles, growing wheat on the largest area is considered as best solution. It should represent more than quarter of the disposition area. While there is single statistic for wheat in Slovak Republic, in Czech Republic is divided for winter, spring and triticale. The winter wheat had better parameters from the model construction point of view, therefore is a large proportion in the solution. Spring wheat had lower yield stability and because of that represents only small percentage in the solution. The second biggest sowing area is corn for feed and shows the best economical results of crops. It is probable due to the fact, that it is not so sensitive for dry periods of year, climate warming is helpful. Third in the row, barley should be sown in a large amount compared to other crops. Based on results, spring barley is more advantageous in Czech Republic because from the gross hectare profit point of view it is better than winter barley. Sunflower or oil-seed rape should cover a sufficient percentage of the area. Sunflower has a lower long-term economic return than rape, which achieves high stability and is better in terms of production economics. Feeds on

arable land have a lower economic advantage that thick sown crop. Also because of this factor, the results recommend sowing corn for green on a smaller area than previous commodities. However, when sowing is being determined, animal production requirements should also be considered. If the possibilities of sugar rape growing are not limited, its area would be very large compared to the last determined area. The reason is its high economic value and special additional titles. Permanent grassland, pastures, vineyard, other one-year feeds and multi-annual feeds should be grown in the smallest percentage distribution. In Czech Republic, hops, other potatoes and poppy, are also very important. Czech Republic has a leading position in EU. Growing of remaining crops was identified as ineffective. Oats belongs to marginal crops in terms of growing areas and they appear as more profitable than rye, which also is not in the optimal sowing program. Also, edible peas are not in this program because is highly unstable and show long-term negative numbers from economic point of view. Neither triticale nor other crops are significant to be in the classification. Their inclusion would lead to a decrease of expected profit. The described optimal distribution of agricultural commodities corresponds to both area. We can say that they do not differ in optimal combination, except for negligible deviations. Regarding the impact of changes in the structure, the biggest effects would be the change of area by additional % from overall land used in corn region. In Slovak Republic, the greatest positive effect in terms of all criteria on the value of expected benefits would be mainly caused by sugar rape, particularly corn for feed and oil-seed rape with higher values. The sowing of corn for green, sunflower for seed or wheat would have a negative impact. Also, grasslands and pastures would have negative impact on the game result. By the analysis of results in Czech Republic, we found that the most rewarding would be the expansion of the area for growing mainly hops and potatoes, as well as corn for feed. It would be inappropriate to increase sowing of sunflower for seed, other one-year feed and corn for green are. The permanent grassland would bring the lowest negative impact. By the analysis, we found that to identify optimal sowing on the land, subsidies would not have significant affect no either Slovak or Czech Republic. The effect would only be reflected in the expected profits over the worst variant in appropriate nature status or in case of loss over the best option in appropriate nature state. With mixed strategies, the positions of both areas are balanced. The Slovak Republic corn region appears as more effective and in case of another rule, Czech Republic is more effective.

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DEVELOPMENT OF MARKETING MARGINS OF DAIRY INDUSTRY IN SLOVAKIA

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Abstract

The objective of this paper is to provide the basic estimation of the development of marketing margins of milk and trade margins of dairy products such as Edam cheese, butter and soft curd in Slovakia. Monthly price data for the years 2001 and 2017 are used to estimate the marketing margins in the food supply chain. The data show an increase in the marketing margins during the last years.

Keywords: *marketing margins, price formation, retail and producer prices, dairy market*

JEL classification: *E30, O13,Q10, Q11,*

1   Introduction

A number of studies about food prices in commodity markets show the price volatility during the last decades (OECD, 2012) when a significant decrease led to considerable issues, especially at the producer level. The aim of these studies was to understand the linkage between producer and retail prices and same as the change of marketing margins over the time period. The natural assumption was that the price changes at the retail level depended on the price change at the producer level. However, amount of results confirmed the asymmetric price transmission between various levels of the food supply chain (Aguiar & Santana, 2002; Serra & Goodwin, 2003; Bakucs & Ferto, 2008; Simioni et al., 2013; Zeng & Gould, 2016; Jeder et al., 2017). It raised other concerns regarding well-functioning of food

supply chain and obviously increasing gap between producer prices and prices paid by the consumers, thus the distribution of marketing margins in the chain.

The topic of margins is an important issue which is closely connected to the income of producers with the consideration especially small farmers and producers. As Wohlgenant (2001) states, the marketing margin is an equilibrium entity that is a function of the difference between equilibrium retail and farm prices in the given product. The retail price should include the farm price plus wholesale and retail costs, plus any margins earned at each level (London Economics, 2003).

Marketing margins indicate the performance, market structure or efficiency of the specific sector (Carambas, 2005; Abassian et al., 2010). They may also reflect the costs and profits of intermediaries, as well as to signify the incentives or disincentives factors in the business (Achike and Anzaku, 2010).

The aim of the producers, wholesalers or retailers is to gain the maximum profit from sales of their agricultural production which is reflected in the marketing margins. They show the value-added, the price of all utility adding actions at each stage along the market chain (Bonabana-Wabbi, 2013) and also reflect services like the assembling costs, processing, transporting, marketing (Elitzak 1997) or labelling, information about products retailing added to the farm products etc. Thus, margins represent the aggregate processing and retailing firm behaviour which influences the level, variability and transmission of farm prices (Abassian et al., 2010).

It follows that the price transmission is closely related to marketing margins, which confirms a number of studies examined this topic in many contexts (Reed, 2002; Peterson, 2004; Bakucs & Fertő, 2006; Dawe & Maltsoglou, 2009; Kızılaslan & Elmali, 2012), often also as a reaction to the sharp volatility of producer or retail prices (London Economics, 2003; Niemi et al., 2011).

In considering the marketing margins should be taken of composition the whole structure of food supply chain because margins are different for different levels. To make a complete analysis is needed to analyse the total flow of products what Carambas (2005) achieved through the use of market-behaviour equations.

As Bonabana-Wabbi (2013) states, too high marketing margins exist either because of monopolistic elements in the marketing chain or because the real costs of marketing are high. In increasing the retail margins are often reflected declining farm shares, though, over the time (Reed et al., 2002).

The study developed by Gardner (1975) give a basic frame for analysing the marketing margins. He defines the main sources of variation in the farm-retail price spread, depends on shifts in retail-level demand and shifts in farm-level supply. He also assumes a stronger impact of retail-level demand shifts than of farm-level supply shifts (Meyer & Cramon-Taubadel, 2004). Similarly, Wohlgenant

(2001) provided a review of the development of empirical models. As a part of the analysis was the definition of variables which influence the marketing margins of the retail price. The demand shifters like population, income or the marketing input costs stated as the main factors and followed by other variables like market power (Holloway & Hertel 1996) price risk, product quality, store-brand share (Ailawadi & Harlam, 2004) and others.

The paper provides the estimation of the development of marketing margins selected food commodities in over the period of 2000 to 2017. Specifically, the aim is indicating the distribution of retail prices of the milk and dairy products such as Edam cheese, butter and soft curd into the shares of producer prices, processing, marketing (trade) margins and taxes in Slovakia.

2   Data and Methods

Monthly price data, in the period of time from January 2001 to October 2017, are used to estimate the marketing margins in the food supply chain for milk and the other commodities such as Edam cheese, soft curd and fresh butter. The producer and wholesale prices are obtained from National Agricultural and Food Centre and consumer/retail prices come from Statistical Office of the Slovak Republic. The prices before the 1st January 2009 are converted to Euro currency by official conversion rate (30,1260 Skk/€).

Different methods are developed to measure marketing margins. Except for several approaches of various authors mentioned above, generally, three methods have been adopted to determine marketing margins (Agra, C. E. A. S., 2007; Niemi et al., 2011):

- National accounting records have been employed to estimate, by deduction, the proportion of consumers´ expenditure, which is used in the processing, and distribution of food.
- The uses of comparative pricing have been widely adopted in a number of examinations of prices and margins in the food sector has also employed the technique for many years in the calculation of price margins for a variety of agricultural products.
- The uses of individual accounting records. This method would bring the more detailed analyses but the limitations come from the reluctance of companies to provide such sensitive information.

Basic framework of marketing margins computing

Apart from observing the price developments between agricultural commodities and products, it is also interesting to track the development of the share of marketing margins.

The total value of marketing margin was dependent on processors margins and trade margins. The analysis of marketing margin, which is mathematically stated below, is employed to estimate the marketing margins of wholesalers and retailers.

Trade margins (M_t) are calculated as the difference between the actual or retail price on milk purchased by consumers and the distributor or wholesale prices. This is expressed as percentage of the retail price as:

$$M_t = \frac{M_t}{P_r} \times 100 \ (1)$$

where the M_t (%) is the percentage share of trade margins on the retail price. M_t characterizes the value of trade margins and P_r expresses the retail price. Similarly, processors margins consist of the difference between processor margin and price paid to producers by processing plants.

$$M_W = \frac{M_w}{P_r} \times 100 \ (2)$$

where the M_w (%) is the percentage share of processor or wholesaler's margins on the whole retail price. The farmer margins calculation is realized as the percentage share of the primary producer price (P_p) on the consumer price.

$$P_p = \frac{P_p}{P_r} \times 100 \ (3)$$

$$P_r = P_p + M_t + M_W + VAT \ (4)$$

The total retail price consists of the farmer margins, trade and processor margins and value-added tax (VAT). Concerning VAT in the observed time period, from 2001 until December 2002 the VAT for milk was 10% at a reduced rate. From 2003 increased to 14%. Later, from the year 2004 until 2010 increased to 19% and from 2011 rose up to 20%. Lately from 2016 was accepted the reduced rate of the tax for basic foodstuff including milk.

3   Results and Discussion

Figure 1 **Development of price series of cow' milk (Eur/kg)**

Source: National Agricultural and Food Centre, Statistical Office SR.

The calculations of marketing margins are based on the price development on the dairy market from 2001 to 2017 and Figure 1 illustrates the individual price series at the time. To examine the marketing margins more thoroughly is better to divide it into two smaller levels of the retailer margin and wholesaler margin. For a comprehensive analysis of the margins relations food supply chain is useful to closely quantify the profits at the individual stages i.e. at farm, processor or retail level. The calculations concerning the structure of consumer prices of milk, Edam cheese, soft curd and fresh butter are informative because, at the present, there is no such detailed database of statistical data for this type of analysis. For this reason, the marketing margins are calculated covering the price range between the purchase and consumer prices for the milk and wholesale and consumer prices for dairy products. Margins reflect the particular part of the consumer price that covers the costs and profits of the processing industry and trade.

Figure 2 **The structure of consumer price of milk (%)**

Source: Data: Agricultural and Food Centre, Statistical Office SR, own calculations.

The development of marketing margins of milk is illustrated in Figure 2. Over the observed period, the development of producer, wholesaler and consumer prices were relatively volatile. At the beginning of the year 2001, the trade margins reached to negative values but from the long-run perspective, trade margins have had a growing trend over the period from 2002 to 2017. Contrariwise the processors' margin showed the decreasing trends. The percentage share of total marketing margin from consumer price for milk, for example, has grown from about 37% in 2003 to about 55% in 2017.

Producers have been receiving a lower proportion of the retail price of liquid cow's milk. The producer's share in the price of milk, for example, has diminished from about 52 % in the year 2000 to just over 35% in 2017.

The development of price spreads of Edam cheese, soft curd and fresh butter are illustrated in Figure 3. 4. and 5. The trade margins are calculated all these dairy products. The retail and processor prices of Edam cheese exhibit considerably higher variability than at butter and soft curd what is reflected in the development of trade margins. Lately, we have recorded only a small share of trade margin for Edam cheese just about 5% in the year 2017.

From the structure of the consumer price of soft curd follows that the share of processors on consumer price had relatively balanced trend last decade.

The share of trade margin shows the largest differences in the fresh butter when, for example, it has grown from the almost 5% of share at the beginning of the year 2002 to 33% in 2015.

Figure 3 **Development of structure of retail price for Edam cheese (in %)**

Source: Data: Agricultural and Food Centre, Statistical Office SR, own calculations.

Figure 4 **Development of structure of retail price for Soft curd (in %)**

Source: Data: Agricultural and Food Centre, Statistical Office SR, own calculations.

Figure 5 **Development of structure of retail price for Fresh butter (in %)**

Source: Data: Agricultural and Food Centre, Statistical Office SR, own calculations.

4 Conclusion

The goal of this paper has been estimation the structure of retail price within marketing margins.

Margins reflect the particular part of the consumer price that covers the costs and profits of the processing industry and trade. The broad objective is to indicate the distribution of retail price in the dairy sector into shares of producer prices, processing and marketing margins, and taxes. Similarly, the trade margins are computed for dairy products.

The broad objective is to indicate the distribution of retail price into shares of producer prices, processing and marketing (trade) margins, and taxes for cow's raw milk. Similarly, the trade margins are computed for dairy products such as Edam cheese, fresh butter and soft curd.

The calculations concerning the structure of consumer prices of selected product are informative and the marketing margins are calculated covering the price range between the purchase and consumer prices for the milk and wholesale and consumer prices for other dairy products. Our analysis of marketing margins in Slovakia covers the period of time from 2001 till 2017. As a result, there is an increase in the marketing margins during the last years and the producers have been receiving a decreasing share of the total revenue obtained from the milk market.

As some reasons for spreading differences between the prices on the producer and retail stage and also as an explanation of increasing trends in processors and trade margins and for declining producer margins authors often mentioned the competition issues in the sector with which is connected the abuse of a dominant position in the market, then asymmetries in the price transmission, processing changes in the sector or changes in agricultural policy (Bakucs and Ferto, 2006; Niemi, 2006,). For better understanding the price formation and for a comprehensive analysis of margin relations would be useful provide a careful analysis of the available empirical evidence and closely quantify the profit at the individual stages at farm, processor or retail level.

Acknowledgements

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MODELLING THE MILK PRODUCTION AND ECONOMICS IN A DAIRY FARM

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Abstract

The paper focuses on factors affecting the economics of milk production based on modelling future effects of present managerial decisions. Using the innovative interactive decision tool we identify key future economics of a dairy farm based on relevant data of herd structures in Slovakia. We introduce EkonMOD milk tool assisting dairy farm managers in Slovakia to better understand the dynamics of the herd structure and to improve the interpretation of economically sensible decision-making on key variables as well as trade-offs respecting the farm´s specific limitations along with carbon footprint mitigation agenda.

We evaluate a sample dairy farm from the economic and performance indicator datasets of the NPPC, referring to semi-intensive dairy farm. If the age at first calving is reduced from 30 down to 24 months, the dairy could expect additional heifers for potential sale, growth, or culling pressure on the lactating herd. This scenario means that in the first two years heifer development is emphasized, expenses in feed and management are decreased by 47,520 € per year, and 53,750 € worth of heifers are sold, bringing the total potential income for those two years to 101,270 €. The reduction of Age at first calving (AFC) in the what-if scenario 1 also reduced the number of heifers needed for replacement from 290 to 269 heifers, also having the positive impact on the profitability resulting from this interrelations. In the what-if scenario 2 the AFC remained the same as in what-if scenario 1 (also the culling rates for the first and next lactation cows) meaning that the number of replacements needed was without any change.

1 EU dairy farming and diary economics

EU dairy farming systems are increasingly faced to the ongoing structural changes associated with the shift to large intensive systems, being more profitable and competitive in the global level. According to study of Burrell and followed by Dries the smaller, locally operating milk producers and their producer associations diffused all over Europe, are substituted by more concentrated and leading to an almost complete integration of these associations into the integrated downstream cooperative and MNC (Multinational corporations) managed by processing industries. (Burrell, 2004; Dries et al., 2009).

EU dairy production can be broadly divided into five main economic-technical systems, however still with significant variation within each system. As reported in this study[2] of the EU intensive high input-output system is dominantly located in Netherlands, England, France, Sweden, Denmark and Germany, accounting for the majority of dairy cow numbers and milk output. The average herd size and stocking rates are relatively high. The average herd age tends to be young which implies a relatively high replacement rates (CEAS, 2010).

The key point when considering the optimal housing system, nutrition strategy, microclimatic levels and other related issues is categorisation according to age of animal. In general, the dairy herd age metric are as follows (Brestenský and Mihina, 2006):
- Calves (from born to 6 month of age)
- Young cattle rearing period (heifers from 6 months till first calving)
- Bull fattening (if present on farm)
- Cows (from first calving till culling)

When considering the animal physiological requirements the more detailed age categorization into subgroups is needed. The main nutrition-based structure involves three main subgroups:
- calves during prophylactic rearing period (critical colostrum intake)
- calves in milk feeding till weaning
- calves from weaning until the age of 6 months

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[2] Available at ec.europa.eu/environment/agriculture/pdf/dairy.pdf

Replacement heifer breeding is also divided into three main subgroups:
- Heifer rearing until 12 months
- Heifer rearing from 12 until 24 months (usually until the 5.-7. month of pregnancy)
- Pregnant heifers from the 5.-7. month of gravidity till the first calving

Dairy cow herd grouping according to the reproductive cycle is being categorised as follows:
- Productive cows (from colostrum till dry period)
- Dry cows (from dry off until the beginning of calving)
- Cows in calving period (preparation for calving, calving and colostrum production)
- First calving heifers (special category)

1.1 Economic sustainability of dairy production

The dairy sector, and agriculture in general, faces three key challenges: the need to produce more in order to feed a growing world population, to produce something different (adjust to consumer demands for food and new services) and, last but not least, to produce better (in respect of the environment, ecology and efficient resource use). The latter challenge is often the first to be associated with sustainability, although sustainability comprises not only the environment, but also includes social (people) and economic (profit) dimensions (De Jong, 2013). The importance of animal-source foods in maintaining the health and nutritional status of inhabitants of developing countries, for whom the supply of high-quality protein is often limited, is well recognized. A common description of sustainability is the ability of a system, a firm or a sector to survive in the long run. The concept of resilience indicates the ability of a system, firm or sector to maintain its structural and functional capacity after a disturbance or shock (Perrings, 1998). Resilience is evidenced by an ability to recover and persist. According to Garmestani et al. (2006) the most resilient industries will be those with functions spread across the range of firm size.

1.2 Decision support tools for dairy farm management

Integrated information tools will be a major contributor in the realization of a sustainable development, although receiving only limited attention in current research generally (Melville, 2010; Korte et al., 2012), and especially in agriculture (Aubert et al., 2012). Agricultural production decision-making is becoming

more complex, due in part to increased competition caused by the globalization of agriculture and the need to adopt more sustainable farming practices (Rogers et al. 2004). The decision support tools typically have quantitative output and place emphasis on the end user for final problem solving and decision making (Newman et al. 2000). Software applications can facilitate effective farm management by recording data efficiently, analysing it, and generating a series of evidence-based recommendations. The benefits of using a decision support tools are that it can improve individual productivity, improve decision quality and problem solving, as well as facilitate interpersonal communication. It can also improve decision-making skills and increase organizational control (e.g. Power, 2002; Turban et al., 2007).

Optimal replacement decisions are cited as one of the most important factors affecting dairy farm profitability (van Arendonk, 1985), and these decisions are directly affected by fluctuations in milk price, salvage values, and replacement costs. Culling decisions are based primarily on milk production and partially on health status. Despite their economic importance, culling decisions are often made in a nonprogrammed fashion and based partly on the intuition of the decision maker (Lehenbauer and Oltjen, 1998). According to Compton et al. (2017) dairy industries and farmers need benchmarks for culling and mortality against which they can compare themselves, as well as improved understanding of the extent of any change and of any associated factors.

2 Data and Methods

The economic and production input data was obtained from database developed by National Agricultural and Food Centre, Research Institute for Animal Production Nitra, the Institute for Animal Husbandry Systems, Breeding and Product Quality, best referring to the conditions in Slovak dairy farming systems. This detailed dataset (since 2000) enables the correct assessment of real-farm problems and opportunities based on farming system applied. Based on these data, the dairy sector is able to define the points of interest (for economic optimization and greenhouse gas mitigation agenda) with regard to specific dairy farming systems used.

The result of complex evaluation of economic and production indicators is the assessment of the dairy farm efficiency. This approach also allows comparison between peer operations as well as, benchmarking on the farm level. The metric included in the evaluations are based on parameters describing the calves and replacement heifer rearing cost and production metric of liveweight and weight gains. The following list of parameters is according to Daňo et.al (2007)

fundamental to construction of dairy herd turnover economics evaluation and projections.

Parameters:

P_{NC} – New-born calf price
C_{NC} – New-born calvf cost
C_{SC} – Cost to rear a selected calf
C_{WC} – Cost to rear a weaned calf 6 (8) months
W_{WC} – Average liveweight of weaned calf 6 (8) months
C_{SH} – Cost to rear a selected heifer
C_{PH} – Cost to rear a pregnant heifer
C_{SB} – Cost to rear a selected bull
C_{CH} – Cost to rear a first calving heifer

When assessing the complex economic evaluation procedure the equations 1-8 are crucial. They represent the rationale of determining the cost of production within and during the rearing periods along with performed farm decisions in evaluated time period. They are supportive when establishing the framework for milk production system and husbandry systems optimization in line with consistency plans for economic and non-economic volatility. This also implies updating the break-even point of productions and to cycle this calculations to ensure that the dairy operation outputs and performance indicators meet the necessities determined by the market. Setting the minimal milk price to reach zero profitability or minimal milk yield per cow or total costs per cow per year then support the farm management to agile responds.

Equations for parameters:

$$1.\ C_{NC} = W_{NC} * P_{NC}$$

$$2.\ C_{SC} = \frac{W_{SC} - W_{NC}}{G_{CL}} * C_C + P_{NC}$$

$$3.\ C_{WC} = (180 * C_C) + P_{NC}$$

$$4.\ W_{WC} = (180 * G_{CL}) + W_{NC}$$

$$5.\ C_{SH} = \frac{W_{SH} - W_{WC}}{G_{HL}} * C_{YC} + C_{WC}$$

$$6.\ C_{PH} = (x_1 * C_{YC}) + [(x_0 - x_1) * C_{PH}] + C_{WC}$$

where:
$x_1 = A_{FC} - 330\ days$

$$x_0 = \frac{W_{SH} - W_{WC}}{G_{HL}}$$

$$7. \; C_{SB} = W_{SB} * C_{FBW} = \frac{W_{SB} - W_{WC}}{G_{BL}} * C_{FB} + C_{WC}$$

$$8. \; C_{CH} = (150 * C_{PH}) + (x_1 * C_{YC}) + C_{WC}$$

Where:

C_C –Total cost per feeding day of calf

C_{YC} –Total cost per feeding day of young cattle

C_{PH} –Total cost per feeding day of pregnant heifer

C_{FB} –Total cost per feeding day of fattened bull

C_{FBW} –Total cost per kg of liveweight of fattened bull

W_{NC} –Average liveweight of new-born calves

W_{SC} –Average liveweight of selected (slaughter) calves

W_{SH} –Average liveweight of selected (fattened) heifers

W_{PH} –Average liveweight of selected (pregnant) heifers

W_{SB} –Average liveweight of selected bull

G_{CL} –Average liveweight daily gain of calves

G_{HL} –Average liveweight daily gain of replacement heifers

G_{BL} –Average liveweight daily gain of fattened bulls

A_{FC} –Average age at first calving

3   Results and Discussion

Resilient livestock production requires locally tailored solutions. Sustainable dairy farming is dependent on the agility of management to continuously tailor the operation according to the market projections, output and input price volatility, with respect to the animal welfare standards. The decision support tool concept for dairy farm managements can be used to evaluate the economic consequences of different on-farm strategies.

Number of heifers needed for replacement we calculated by using several herd specific metrics: If the annual replacement rate of first lactation cow depicted in Figure 1 is set to 35%, and 25 % for remaining stages of lactations in a 300 head herd, a minimum of 170 heifers in the pool, assuming a 4% attrition factor for stillbirths, 100 % dairy cow natality, 5 % mortality of calves. With selection of calves indicator set to 4 %, 50 % ratio of heifers born, heifer selection at 20 %, culled cows that die before disposal set to the value of 20 % and average age at first calving (AFC) 24 months, proximately 64 pregnant heifers are needed. When calving is delayed to an age greater than 24 months, heifers are accumulating in

the replacement pool. For every one month increase in the age at calving over 24 months, the replacement inventory numbers are increasing at a rate of 4.7% in this model. This figure takes into account the inventory of heifers from birth through calving. Therefore, if a herd is calving 28 month old heifers with an average culling rate of first lactation cows 35 % and remaining cows in herd with 25 %, the number of replacement heifers on the farm is now increased from 170 to 199 heifers (Table 1). This equates to 29 additional heifers or an increase of 17 % in the total number of heifers consuming feed, labour, fuel, facilities, and management. The tables below demonstrate the increase in heifers needed at various culling rates (Table 2) and the relationship between the culling rate, age at first calving, and increasing heifer inventory (Table 3). Calving older heifers is subtracting money from profitability. Producers should raise only the number of replacement heifers needed, unless the additional heifers will be marketed (Bailey et al.).

Figure 1 **EkonMOD milk model calibration**

Source: Záhradník and Pokrivčák, 2016.

Table 1 **Number of replacement for each age at calving in a 300 cow herd**

Months	24	26	28	30	32	35
Replacement heifers	170	185	199	213	227	249

Source: Own calculations.

Note: Total heifer inventory numbers for varying herd sizes at a 35% replacement per year for first lactation cows and 25 % replacement per year for cows at remaining lactation stages. Other rearing parameters are taken from the following assumption: 4% stillbirths, 100 % dairy cow natality, 5 % mortality of calves, selection of calves 4 %, 50 % ratio of heifers born, heifer selection 20 %, culled cows that die before disposal 20 %.

Table 2 **Number of replacement heifers for various culling rates**

Culling Rate	Increase in heifer pool numbers over 24 month calving age ^)
25/35*	170 (20 surplus heifers) (32^) = 202** (2 deficit heifers)
26/36*	176 (17 surplus heifers) (45^) = 221** (6 deficit heifers)
27/36*	180 (15 surplus heifers) (46^) = 226** (8 deficit heifers)
27/37*	182 (14 surplus heifers) (47^) = 229** (9 deficit heifers)
27/38*	184 (13 surplus heifers) (48^) = 232** (11 deficit heifers)

Source: Own calculations.

Note: Calving at 24 Months of Age. *Culling rates for second and following lactations/culling rates for first calving heifers. Other rearing parameters are taken from the following assumption: 4% stillbirths, 100 % dairy cow natality, 5 % mortality of calves, selection of calves 4 %, 50 % ratio of heifers born, heifer selection 20 %, culled cows that die before disposal 20 %. **Increase in heifer replacement numbers for various culling rates in 300 cow herd: First calf heifers calving at 30 months.

The current research indicates an average cost to raise a heifer 1824 € (Michaličková et al.) A herd of 300 lactating cows with a culling rate of 25/35 % will need to calve 88 heifers per 12 months. If the average calving age is 30 months, the increase in expenses is approximately 540 € per heifer for those 6 months over goal. This transforms to 47 520 € loss per year in extra labour, feed and fuel. An additional loss in calving heifers at more than 24 months of age is the increase in heifer inventory numbers (Table 42). If producer A is calving heifers at 24 months of age per 300 cows and producer B is calving at 30 months of age, producer B will have additional heifers in his replacement pool to meet the same culling rate as

producer A. The higher AFC accumulates the heifers in inventory. For each additional month over goal of 24 months, 4.7% more heifers are needed in replacement inventory in this model. If producer A needs 171 heifers in his heifer inventory for a 24 month turnover of heifers (from born to calving). Producer B, to meet the same culling rate, will need 214 heifers on his farm. These 43 additional heifers are unnecessarily consuming feed and management (Table 42). Returns from this period down to 24 months could also represent generated income. If the age at first calving is reduced from 30 down to 24 months, the dairy could expect these additional heifers for potential sale, growth, or culling pressure on the lactating herd. This scenario means that in the first two years heifer development is emphasized, expenses in feed and management are decreased by 47,520 € per year, and 53,750 € worth of heifers are sold, bringing the total potential income for those two years to 101,270 € (Table 43). Dairymen should not anticipate reducing the age to calving in several months, as experience indicates that it takes at least 18 to 24 months to decrease age at calving to a goal of 24 months (Bailey et al.).

Table 3 **Economic impact of changed input variables**

Form for estimating heifer rearing economics for a 300 cow herd:
Cost of raising a heifer to 24 months of age = **1900€**
Cost per Month over 24 months in additional expenses = **90€**
Herd at **26/36%** culling rate
Herd calving heifers at 30 months
6 months over goal of 24 months
6 months*90 € = 540 € per heifer per year
Calving **88 heifers in 12 months @ 540 €** additional cost = **47,520 €**

Transition to reduce age at calving to 24 months of age
Reduced to **24 month** age at first calving would need less heifers
See Table 1 (reduce inventory from 213 to 170 heifers or 43 heifers over 2 years) heifers selling for 1250 €

1250 €*43 surplus heifers 1. and 2. year = **53,750 € total over 2 year transition period

Source: Form adapted from Bailey et al., own calculations.

Note: **One time transition recovery of income decreasing from 30 Months to 24 Month. Typically accomplished over a 2 year period of time

Sample farm approach

We use the application **EkonMOD milk** tool when supporting the management decision. Moreover, we present the sensitivity analysis feature of the tool.

We run several what-if scenarios and assess the impact on dairy farm performance.

We consider sample dairy farm from the economic and performance indicator datasets of the NPPC, **referring to a typical semi-intensive dairy farm**. The economic impact of decreased AFC and improved indicators during rearing period are summarized in Table 4. The two alternative management approaches are considered. The sensitivity analysis in scenario 1 and 2 represent a typical problem occuring in dairy operation. The sample dairy farm used in this evaluation run an operation with 423 dairy cows. The culling indicator for first lactating cows reaching 36 %, and on second a next lactations 30 % on average. The natality of cows is 95 %, with 7 % stillbirth rate and 11 % calve mortality. Calves selection at the level of 14 % with ratio of heifers born 50 % and 20 % of cows dying before disposal resulted in a need for 290 heifers (from birth till calving) to maintain constant herd size. This performance is related to the 25.8 months of AFC (789 days).

However, the operation did not fully meet the requirements for replacement heifer internally. The performance resulted in 31 heifer deficit, implying the purchasing those heifers from external sources on the market or degreasing the herd size. The what-if scenario considers the decrease of average AFC in this dairy operation to 24 months (733 days). This management adjustment will lead to reduction of heifers inventory needed for replacement. The preposition will decrease the amount of heifer need for replacement to 269 and parallel dilute the deficit to only 21 heifers.

The what-if scenario 2 provides a next step in sensitivity analysis assuming improvements in rearing performance. The stillbirth rate decrease from 7 % to 4 %, calves mortality indicator decrease from 11 % to 5 % and calves and heifer selection decrease from 14 % to 9 % and 20 % to 18% respectively, will cumulatively results in having 3 additional heifer for sale, while the number of heifers needed for replacement remaining the same.

Table 4 **Sensitivity analysis – AFC and heifers (calves) rearing period**

	Real data	What-if scenario 1	What-if scenario 2
Dairy cows numbers	423	423	423
Culling (1. lactations)	36%	36%	36%
Culling (remaining lactations)	30%	30%	30%
Dairy cow natality	95%	95%	95%
Stillbirths	7%	7%	4%
Calves mortality	11%	11%	5%
Calves selection	14%	14%	9%

	Real data	What-if scenario 1	What-if scenario 2
ratio of heifers born	50%	50%	50%
Heifer selection	20%	20%	18%
culled cows that die before disposal	20%	20%	20%
AFC (days)	789 days	733 days	733 days
Number of heifers needed for replacement	290	269	269
Replacement heifers surplus or deficit	-31	-21	3

Source: Own calculations.

Moreover, we can assess the financial aspects of this analysis. If we consider price for culled cow 590 €, cost to raise a heifer 1500 €, price for purchased heifer 1065 € in this operation, the real data case yielded the economic result of 29 903 €. The what-if scenario 1 decreasing the AFC by 56 days will generate 10961 € of additional profit and the what-if scenario 2 optimizing the rearing period resulting in 62 794 € profit, which is almost doubling the original economic result of the sample dairy farm. The analysis is depicted in Figure 2.

Figure 2 **Economic analysis – EkonMOD milk results I.**

Source: Own calculations.

The figure 3 outlines different perspective on the same situation within the sensitivity analysis. The reduction of AFC in the what-if scenario 1 also reduced the

number of heifers needed for replacement from 290 to 269 heifers, also having the positive impact on the profitability resulting from this interrelations. In the what-if scenario 2 the AFC remained the same as in what-if scenario 1(also the culling rates for the first and next lactation cows) meaning that the number of replacements needed was without any change. However, the improved performance during rearing period contributed with surplus heifers to the financial benefits doubling the original value coming from the real data case.

Figure 3 **Economic analysis – EkonMOD milk results II.**

Source: Own calculations.

The results for any input change proposed is easy accessible, without any need for additional calculation or script procedure, and visualised by interactive dashboard. Moreover, the application outcomes are more clearly visible, also respecting the interrelations logics and methodology used. To go more in detail, we will move to add more managerial scenarios to the AFC sensitivity analysis and see the economic results for this modifications.

We have dealt with the optimal bodyweight (BW) of first calving heifers given the specific AFC. This structured analysis underpins the wider framework of economic optimization of individual dairy production system. The previous work in the sensitivity analysis documented that lower AFC implies fewer replacement heifer needed. However, the reduction schemes are very farm dependent and directly linked to the intensity of calves and heifer growth. The critical point is the optimal combination of daily weight gain leading to the optimal body condition score. The optimal BW of first impregnated heifers should vary between 300-360 kg reaching approximately 55 % of mature cow BW. Moreover, heifer should reach 610 kg of BW when first calving. Every 1 kg below this threshold value implies 2.5 kg reduction in milk production in the first lactations (Fetrow et al., 1986).

4 Conclusion

We have evaluated a sample dairy farm from the economic and performance indicator datasets of the NPPC, referring to semi-intensive dairy farm. If the age at first calving is reduced from 30 down to 24 months, the dairy could expect additional heifers for potential sale, growth, or culling pressure on the lactating herd. This scenario means that in the first two years heifer development is emphasized, expenses in feed and management are decreased by 47,520 € per year, and 53,750 € worth of heifers are sold, bringing the total potential income for those two years to 101,270 €. The reduction of AFC in the what-if scenario 1 also reduced the number of heifers needed for replacement from 290 to 269 heifers, also having the positive impact on the profitability resulting from this interrelations. In the what-if scenario 2 the AFC remained the same as in what-if scenario 1 (also the culling rates for the first and next lactation cows) meaning that the number of replacements needed was without any change. However, the improved performance during rearing period contributed with surplus heifers to the financial benefits doubling the original value coming from the real data case.

The 172 heifers calving per year at the age of 789 days with BW reaching only 80 % will generate an economic loss -35 € on a per cow basis. If the management could improve the performance during the rearing period of both calves and heifers by reducing the average AFC to 733 days (24 months), the economic loss will be only -25 € per cow (reduction 40 %). Moreover, if the dairy farm management could increase the BW of first calving heifers from 80 % to 84 % of average BW of mature cow in the herd (assuming optimum at 85 %), the economic loss will now be only -6 € per cow (reduction 70 %).

Acknowledgements

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SESSION ASECU

ASSOCIATION OF ECONOMIC UNIVERSITIES OF SOUTH AND EASTERN EUROPE AND THE BLACK SEA REGION

BUSINESS ENTITIES IN THE RURAL AREAS AS THE ACTORS OF COMPETITIVENESS AND SUSTAINABLE DEVELOPMENT OF REGIONS

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Abstract

Nowadays, there is a growing interest in regional competitiveness, but it should be noted that such competitiveness is a very broad concept and involves many sectional areas and the factors that affect it. Agriculture is one of the oldest industries and can be considered as an important part of the national economy of the state. A suitable business environment is one of the target instruments to ensure the competitiveness of the regions, which increases the awareness of the region itself. The priority of farms is to create the right conditions for the sustainability and competitiveness of the regions, to protect the environment in the most efficient way and to constantly apply new knowledge from science, research and development, thereby increasing the potential for new business creation in the agro-sector.

The aim of the paper is to evaluate the influence of businesses in the agricultural sector that significantly influence the development and competitiveness of regions. An important aspect in terms of competitiveness of the region is to provide citizens with a higher standard of living. However Slovakia is characterized by significant regional disparities, to which belong disparities in regional competitiveness. The paper is focused on assessment of business structure within the agricultural sector operating in Slovakia and the assessment of the representation of agriculture at regional level calculated on the basis of the location index. Within the Slovak regions at levels NUTS I Slovak Republic and NUTS III Košice region are evaluated socio-economic indicators such as development of the employment in agriculture, the share of

gross domestic product, gross value added, and these can be described as indicators to assess the overall competitiveness of the region. The research is focused on the comparison of the development of comparative indicators of economic level of the agricultural sector in the Kosice region to developments in whole Slovakia.

According to the results of the research it is necessary to point out the fact that Slovak agriculture is currently in a complicated economic situation, caused by the economic crisis and the failing market due to a large number of externalities. The highest representation in the agricultural sector is in the western Slovakia, and moving towards eastern Slovakia, results are reduced to the level of sub-representative representation. For the development of the Košice region, it would be appropriate to attract both domestic and foreign investors and try to keep as many qualified and educated people as possible, as well as having a sufficient interest in increasing competitiveness in this region. The results of the paper show that agriculture in the Košice region is developing in a negative direction.

Keywords: *region, competitiveness, entrepreneurial subject, agriculture, socio-economic indicators*

JEL classification: *R11, J1, J43*

1   Introduction

Nowadays, emphasis is placed on increased attention in the area of regional development, not only within the Slovak Republic but also in the world. Slovakia is characterized by marked regional disparities between regions. A substantial part of many regional differences are given by geographic, cultural, economic, administrative and other centers, which have a negative impact on the development of individual regions in the territory of the Slovak Republic. The basis for identifying the supported regions is in particular an analytical assessment of the situation in individual regions of the Slovak Republic and the definition of problem regions based on selected indicators, which can determine the degree of problem and regional disparities affecting the development of individual regions. Based on socio-economic indicators, areas with the strongest weaknesses and manifestations of regional inequalities that need to be mitigated can be analyzed.

Agriculture is one of the oldest industries and can be considered as an important part of the national economy of the state. Agricultural enterprises in the agro-sector, which can be understood as engines of regional development, also have a significant share in the development of regions. Therefore, it is necessary to create conditions that would facilitate the emergence of new businesses in the agro-sector, maintain and further develop existing businesses. These businesses

create new job opportunities, contributing to increased employment and greatly influencing the stability of the whole region. A suitable business environment is one of the main instruments to ensure the competitiveness of the regions, which increases the awareness of the region itself. The main interest of the region should be the development of a suitable business base, thus ensuring better living conditions for the inhabitants of the regions. Enterprises in the agro-sector must adapt to ever-changing conditions, a competitive environment and a steady increase in economic and technological efficiency of production.

The current trend of farms has a steadily declining tendency. The structure of the legal forms has changed significantly, resulting in a decline in the number of workers in the sector. The priority of farms is to create suitable conditions for the sustainability and competitiveness of the regions, to protect the environment in the most cost-effective way and to constantly apply new knowledge from science, research and development, thereby increasing the potential for new business creation in the agro-sector.

1.1   Region

Understanding the concept of a region is very inconsistent, and it is used in different ways in professional works. It has a wide-ranging content from the point of view of the approaches to its definition that we have encountered in the works of domestic and foreign authors. Its exact definition is difficult. We can meet different interpretations of the region with different terms and different meanings. The Region has its content definition in many disciplines such as in economics, history, sociology, statistics, ethnography, geography and urbanism. Since it is possible to identify and define a large number of regions, its most appropriate definition depends on the purpose for which the region is to serve. [3] The region can be seen as a certain link between the whole of society and the local population. It is a defined area where dynamics of the state and the local population meet, with the region providing the opportunity to concentrate local initiatives and evaluate them as a whole. [4]

Under Act 539/2008 Zz. on regional development support, the region is a territorially defined area for the creation and implementation of regional and structural policy at level two or three according to the classification of statistical territorial units.[5]

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[4]   KOŽIAK. *Zmierňovanie regionálnych disparít prostredníctvom regionálnej politiky.* 2008
[5]   Act 539/2008 on regional development support

A special figure for defining planning regions is their classification called Nomenclature of Territorial Statistical Units - NUTS. The European Union has set up a common nomenclature of territorial units for statistical purposes, which allows the collection, compilation and dissemination of harmonized regional statistics in the EU. This five-tier hierarchical built system represents the division of land into territorial units established by the Statistical Office of the European Commission in cooperation with national institutions for the purposes of monitoring and processing analyzes of the economic and social situation in individual regions and for the needs of regional policy.

Table 1 **NUTS classification in SR**

NUTS level	acronym	Territory
Regional level	NUTS 1	Slovak republic
	NUTS 2	4 area:
		Bratislava region
		East Slovakia
		Central Slovakia
		West Slovakia
	NUTS 3	Regions: Bratislava region, Trnava, Trenčín and Nitra region, Žilina and Banská Bystrica region, Prešov and Košice region
Local level	LAU 1	Ditrics: 79
	LAU 2	Municipalities, including urban areas:
		2927

Source: Own processing.

1.1.1 Regionalization and regional development

Several disciplines are taken over by regionalization, geographers are attempting to define it, but the definitions are not quite uniform.

In their definitions, there is a consensus that regionalization is a process of subdivision of territorial units that have their specific character or characters and their separation from territories that do not have that character.

It is a traditional and indispensable method of regional geography. One of the key issues of regionalization is the question of how many regions should be

defined. The number of regions is based on the size of the landscape as well as on the purpose we define them.[6]

Development is generally a very meaningful and serious term, and its interpretation may be very different. In the past, this term has been linked to the concept of economic growth, so development has been linked with growth in production, capital and jobs. At present, the definition of regional development has expanded and includes economic, social, environmental, political and cultural aspects.

To develop, we attribute the main elements that we should include:
1. growth.
2. work
3. equality / justice.
4. participation.
5. independence / autonomy.

Characterization of regional development as a complex of procedures leading to the creation of a prosperous region, in order to build its competitiveness, primarily by exploiting local potential and spatial differences.[7]

Regional development is a permanent process in which a wide range of trade unions and industries are linked whose interrelationships are many times unimaginable or very difficult to specify. The multidisciplinary character of the whole complex of regional sciences is also relevant to all areas of regional development.[8]

1.1.2 Regional policy and regional disparities

In the system of economic and social policy, regional policy has a significant impact. It uses methods and tools to help initiate and promote the use of natural, capital and human resources in the region as well as the comparative advantages of the regions. An important component of a functioning regional policy is:

- Creating institutional structures whose purpose, principles and tools of regional policy help to bring to life,
- Determination of legislative relations between central and regional structures.

Currently, expanding the concept of competitiveness at regional level has a major impact on the direction of regional development policy. It encourages, in particular, a revival of interest in the form of a new regional policy. In the past, regional policy has attempted to make regions competitive by attracting international competing firms, but with limited success. Looking for a new approach to

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[6] MATOUŠKOVÁ. *Regionální a municipální ekonomika*. 2004.
[7] LIPTÁKOVÁ. *Verejná správa a regionálny rozvoj*. 2008.
[8] KOLEKTIV. *Úvod do regionálních věd a verejne správy*. 2004.

regional development is currently focused primarily on increasing the competitiveness of domestic companies.[9]

On the basis of regional policy, economic processes in the territorial parts of the state are affected by the public sector. The aim is to strengthen the positive externalities to make the region more attractive as an economic site, thus contributing to an increase in the inflow of economic activities into the region, thereby increasing its capacity and performance.[10]

The spatial difference of phenomena, together with the widening regional inequalities, are a reflection of potential regions' alternatives in adapting to economic and social transformations and can be seen as a consequence of a different state of factors that determine the development of the region differently.[11]

With regard to regional disparities, it is necessary to pay attention to:

- reasons for the emergence and increase of regional inequalities,
- the consequences of disparities for the population, the economic development of the region, the landscape and the environment,
- measurement of disparities,
- time and space aspects of disparities,
- processing of regional disparities through regional policy instruments.

The main causes of regional inequality can be considered as primary or natural potential, settlement structure, location attractiveness, transport infrastructure, demographic composition, availability of territory and economic expertise of the regions, but also the impact of historical development and spatial-administrative arrangement plays a very important role.[12]

There are significant inequalities between the regions of Slovakia as a result of economic and social activities, which are quite different, and different natural geographic assumptions can be followed to create the same conditions for each activity in the regions. At the same time, the distribution of certain economic and social activities is observable with selective character, with the preference of certain sites, settlements or regions. On the basis of this definition, on the one side, regions with good potential and development dispositions are identified and on the other side a group of problematic and also underdeveloped regions. [13]

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[9]   Regionálna konkurencieschopnosť v kontexte globalizácie, novej ekonomickej geografie a inovačných procesov. 2011.

[10] MAIER – TODTLING. *Regionálna a urbanistická ekonomika 2.* 1998.

[11] KOREC. *Regionálny rozvoj Slovenska v rokoch 1989 - 2004.* 2005.

[12] TVRDOŇ. *Regionálne disparity resp. regionálny rozvoj.* 2007.

[13] GAJDOŠ. *Teoretický a metodologický rámec klasifikácie a typológie regiónov Slovenska v kontexte teritoriálnych disparít.* 2005.

1.2 Competitiveness of the region

Defining competitiveness is a problem for many authors, because they understand it in a different way and therefore create different ambiguities in this concept. There is no uniform definition of competitiveness in the literature. Different definitions of competitiveness are based on several dimensions.

In the area of competitiveness, capabilities, sectors, regions, nations and national groups, sufficient levels of income from factors of production and their use at a sustainable level in today's competitive environment can be created.[14]

Regional competitiveness is an important factor in the development of regions that compete with each other for the creation, acquisition, maintenance and support of economic operators. Businesses stabilize or create new job opportunities and have a major impact on the prosperity and living standards of the regions.

The competitiveness of the region is characterized by indicators that will ensure the competitiveness of the region in another region and bring results that bring regional competitiveness, created. It is the ability of a business, industry or country to compete in order to maintain long-term sustainable prosperity.

In the long run, the economic development of the market economy is closely linked to competitiveness as a key factor in the success of companies, states, regions and municipalities. Regions compete in different ways and, above all, attract the business environment to workforce and capital. Regional competitiveness can be considered to be synergy and complementarity that are found in commercial and other socio-economic activities in the region.[15]

2 Data and Methods

The subject of the paper is the study of entrepreneurial subjects in agriculture in the territory of the Slovak Republic on the basis of selected socio - economic indicators determining the competitiveness and sustainability of individual regions of Slovakia. According to the stated aim of the paper, the methodology used in the paper has mainly descriptive character, using chosen indicators and comparative indicators to provide overview about situation within Slovak republic and Košice region, during period 2004-2013. The data used in the work were obtained mainly from the Slovak statistical office and Research Institute of Agricultural and Food Economics.

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[14] KOREC. Regionálna konkurencieschopnosť v kontexte globalizácie, novej ekonomickej geografie a inovačných procesov. 2011.
[15] WOKOUN. *Teoretické a metodologické přístupy k výzkumu regionální konkurenceschopnosti.* 2009.

To provide overview about representation of agriculture in regions of Slovak republic, was ued localization index:

$$IL = (Eij \div Ei) \div (Sj \div S)$$

Where: • Eij - number of employees i - sector in j-region

• Ei - number of employed i - sector in the country

• Sj - population of j - region

• S - population in the region

– If the IL <1 sector is sub-proportional to the population,

– If IL = 1 is the proportional representation of the given sector to the population,

– If IL> 1 is over-representation of the sector in the region,

3   Results and Discussion

The Slovak Republic's agriculture changed its structure mainly by political changes after 1989. Changes in ownership and organizational conditions were negative events for agricultural primary production, especially in the first years, and were probably considered the most critical in terms not only of the existence but also of the functioning of the entire Slovak agriculture. These negative events were reflected not only in the overall decline in animal and crop production, but also in the number of employees and the average monthly wage.

Since 1990, we have been able to observe an enormous reduction in the share of employment in agriculture in the Slovak Republic, when it can be stated that in 2013 there was a rapid decrease of employment in RV and ŽV by almost 74.6%. Changes also occurred in the share of the average monthly salary of agricultural workers in Slovakia, and since 1990 the average monthly wage has dropped markedly by almost 29.4%.

Picture 1 **Share of employment and average monthly wage within SR in 1990 and 2013 (in %)**

Source: Statistical office SR, own processing.

The business environment of the agro-sector since 2004 has been largely determined by the activities connected with the preparation of Slovakia for accession to the European Union.

In connection with the accession to the European Union, the development of the business structure in the agrarian sector was considerably differentiated in terms of business conditions and entitlements. The system of the business sphere in agricultural primary production and agricultural services represents a wide range of business entities. The business environment in the agro-sector is influenced by size, size, legislation, economic instruments, financial sector policy, and state aid.

According to the results obtained since 2004, the number of owners of both legal forms has fallen by almost half. In agricultural cooperatives, the number of owners in 2004 was 118,068 and in 2013 their number dropped to 56,838, which means that 112 owners are converted into one agricultural cooperative, and there are 8 owners per 100 ha of agricultural land.

In the case of companies, the number of owners was significantly lower, compared to 13 429 in 2004 and 6 506 in 2013, at the same time in 2013 one owner of 7 owners and one owner per 100 ha of agricultural land.

Localization index - representation of agriculture within Slovak regions

Information on the region's representation of the sector in terms of population numbers is provided by the localization index. The location index measures the proportion of the industry to the population. Within the monitored period from 2004-2012, an analysis of agriculture representation at regional level NUTS III was carried out. The values given in the following table (see table 2) are analyzed by agricultural representations within the individual regions of Slovakia. The highest values during the monitored period were achieved in the Nitra region.

This region is characterized by lowlands and suitable climatic conditions, it belongs to warmer regions in Slovakia. It is also indicated as the region with the most suitable and best agricultural and arable land, which ultimately results from the highest value of the localization index and is the most suitable area for agricultural production. In the Nitra region, there is an over-proportional representation of agriculture. When analyzing the localization index, the lowest, sub-proportional representation of agriculture in the observed period in the following regions was: Košický, Prešovský, Žilinský, Trenčiansky and Bratislavský kraj. Over-proportional representations of agriculture were in the Trnava, Nitra and Banská Bystrica regions. In Bratislava region representation of agriculture is the lowest in terms of the fact that it is the region with the smallest area compared to the other regions analyzed.

Table 2 **Development of localization index at NUTS III level in the Slovak Republic**

Region/Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
BA	0,63	0,82	0,53	0,48	0,67	0,70	0,63	0,64	0,62	x
TT	1,49	1,58	1,56	1,56	1,39	1,13	1,04	1,07	1,08	x
TR	0,90	0,80	0,91	0,94	0,91	1,00	1,03	0,97	0,93	x
NR	1,49	1,52	1,55	1,58	1,56	1,54	1,55	1,70	1,63	x
ZI	0,73	0,68	0,77	0,74	0,76	0,72	0,73	0,75	0,83	x
BB	1,14	1,17	1,14	1,20	1,16	1,18	1,22	1,13	1,24	x
PO	0,94	0,86	0,81	0,91	0,84	0,94	0,92	0,91	0,93	x
KE	0,75	0,69	0,81	0,68	0,78	0,82	0,89	0,84	0,77	x

Source: Statistical office SR, own processing.

Analysis of selected socio-economic indicators

Measuring and evaluating development indicators is currently one of the major and most important areas of human activity, particularly in the economy, but also in demography and the environment. Pointers are a number of features. Their main tasks include, in particular, the simplification, clarification and mediation of the information that is important for decision making. They are important in terms of early warning of economic, social and environmental threats.

Picture 2 **Share of agriculture in total employment within NUTS I - Slovak Republic (in %)**

Source: Research Institute of Agricultural and Food Economics, own processing.

The share of agriculture in total employment in the Slovak Republic has a long-lasting tendency. From the point of view of the share of total employment in agriculture in the NUTS I Slovak Republic, during the monitored period it can be said that from 2004 to 2007 the trend of employment represented a decreasing tendency, while in 2007 a significant drop in employment in agriculture. However, the downward trend was of a long-term nature throughout the period under review. In 2013, the share of agriculture in total employment was only 2.18%.

Picture 3 **The share of agriculture in GDP creation within NUTS I - Slovak Republic (in %)**

Source: Research Institute of Agricultural and Food Economics, own processing.

The share of agriculture is calculated on GDP has been on a downward trend until 2006. from 2007 to 2008, there was an increase in GDP, but a significant decline could be observed since 2008 and this trend persisted until 2010 when the value of this year was at the same time the lowest value of agriculture's share of GDP. In

2011, there has been an increase and this trend has continued in the years to come and continues to the present.

Picture 4 **Gross fixed capital formation Picture 5:Gross fixed capital formation in agriculture in SR (in mil. €) in agriculture in Košice region (in mil. €)**

Source: Statistical office SR, own processing.

It is clear that the development of gross fixed capital formation at NUTS I level has been in a fluctuating trend in agriculture. The lowest increase can be observed in 2004 and the highest in 2008 since this year is the declining trend of gross fixed capital formation in agriculture. The decline could be due in particular to low investment in buildings and construction, machinery and equipment, and also to means of transport.

In Košice Region, gross fixed capital in agriculture during the period under review reached the highest amount in 2008 of 73.17 mil. which, compared to 2013, when gross fixed capital reached 37.56 mil. euro, was almost half lower. Comparison of the development of gross fixed capital formation in Slovakia with the Košice region is not very differentiated. In 2004, gross fixed capital in the Košice Region accounted for roughly 10% of the total gross fixed capital of the Slovak Republic, this value being also the lowest achieved value with the other compared years. The rapid increase in gross fixed capital could be monitored in 2008, but this increase was only 11% of the total gross fixed capital of the Slovak Republic.

Comparison of the development of comparative indicators of the agrosector's economic level in Košice region with developments in the Slovak Republic

It can be said that the number of employees in agriculture per one hectare of agricultural land in the Košice Region is considerably lower compared to the Slovak Republic. The lowest number of employees per 1ha in the Košice Region was in 2007 and the highest in 2006. The number of employees in agriculture per

1ha of agricultural land represents an overall reduction not only within the Slovak Republic but also in the Košice region.

Picture 6 **Number of employees in agriculture per 1 hectare of agricultural land**

Source: Own processing.

Gross agricultural output per employee has a fluctuating trend within the Slovak Republic as well as at the regional level in Košice region. Years 2004-2005 are almost identical and reach roughly the same gross agricultural output per employee. The lowest value in the Košice region can be seen in 2010, but the following years are a markedly visible increase. In 2013 there was an increase in gross agricultural output per employee within the SR, but at the regional level there was a decrease in the same year.

Picture 7 **Gross agricultural output per employee**

Source: Own processing.

During the monitored period sales for agricultural products per employee in the Košice Region from 2004 to 2006 were approximately equal in revenue. A significant increase is visible in 2007, but its value has fallen again in the years to come.

The highest increase in sales of agricultural products was in 2012 but a year later its value declined. Within the Slovak Republic, a steady increase in sales of agricultural products per employee can be noticed from 2009 to 2013.

Picture 8 **Revenue from sales of agricultural products per employee**

Source: Own processing.

Gross value added in agriculture per employee in Košice region is only slightly different from the Slovak Republic. In 2007, Košice Region shows a higher value compared to the SR, but this trend did not last long, and next year the gross value added in agriculture per employee was almost identical at the regional level as well as within the Slovak Republic. Since 2010, it can be concluded that gross value added is increasing in both cases.

Picture 9: **Gross added value in agriculture per employee**

Source: Own processing.

4   Conclusion

Agriculture is one of the most important sectors in the economy and its very important function is to provide and secure the nutrition of the population. In spite of this important function, it must observe its competitiveness not only between individual regions within the country but also among countries. At present, competitiveness is a relevant factor, in particular, in determining the success of not only the sector but also enterprises that have to face often the adverse and difficult competitive conditions on the market.

On the basis of the results of the work, the development of the business structure of the agrarian sector in Slovakia was greatly differentiated. The development of primary agricultural enterprises within NUTS I Slovakia has remained unchanged since 2005, but there has been a decline in cooperatives. There was a slight increase in the number of public companies and joint-stock companies, as well as the increase in the number of companies, especially limited liability companies. In enterprises in services for agriculture, on the basis of the results achieved from 2005-2013, the state of state enterprises was stabilized. The other legal forms decreased, but the most significant increase was achieved in the number of registered natural persons.

The region's performance of the region in terms of population was based on a localization index calculation. Localization index was analyzed from 2004-2012. The results obtained show the highest representation of the agricultural sector in the Nitra region. It is also designated as a region in the most suitable and best agricultural and arable land, which ultimately results also from the highest value of the localization index. Sub-proportional representation of agriculture was in the following regions: Prešov, Košice, Žilina, Trenčín and Bratislava regions. Over-proportional representation was achieved in Nitra, Trnava and Banská Bytrica region.

Through the assessed socio-economic indicators at the NUTS I level of the Slovak Republic, there were demonstrable differences in the share of employees, almost half of the less employed work in business companies as in agricultural cooperatives throughout the period under review. State-owned enterprises and contributory organizations are indifferent in terms of employment in Slovakia. In Slovak agriculture, the structure of the working population changed in terms of education as the number of trained workers, university educated people and secondary education workers increased. Due to the decrease in the share of employment, a reduction in the share of the average monthly wage in agriculture was also shown in Slovak Republic and since 2004 it has been almost year-on-year decreasing.

The results of the paper point that Slovak agriculture is currently in a complicated economic situation caused by the economic crisis and failing market due to a large number of externalities. The highest representation in the agricultural sector in the western Slovakia, and moving towards eastern Slovakia, results are reduced to the level of sub-representative representation. For the development of the Košice region, it would be appropriate to attract both domestic and foreign investors and to try to keep as many qualified and educated people as possible, as well as having a sufficient interest in increasing competitiveness in this region. It is clear from the results that agriculture in the Košice region is developing in a negative direction.

Thus, we have come to the conclusion that, when analyzing the selected indicators and the results achieved, it is not possible to determine clearly which factors can influence regional results and competitiveness. Assessing regional potential is a long-term and permanent need to increase its competitiveness. It is therefore necessary to address the widest range of factors that could be measured and evaluated according to the needs of the region.

The primary factors that could affect the economic development of the region as well as the regions as a whole are:

- a qualified and educated population structure,
- the quality and flexibility of agricultural holdings,
- reducing regional disparities between regions,
- innovations,
- location, cultural and geographical conditions,
- increasing the attractiveness of the agricultural sector.

Agriculture represents the most important economic activity and is an important key element that affects the quality of food, the countryside and also ensures competitiveness in the regions. The common vision should therefore be to ensure and strengthen the competitiveness of agricultural holdings, to strengthen employment and to take account of less-favored areas.

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SOCIAL AND ECONOMIC FACTORS OF RURAL MIGRATION IN THE URBAN ENVIRONMENT. THE CASE OF ALBANIA

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Abstract

Migration is a present phenomenon in Albania has been fluctuating over the last two decades, overall performance tends to increase over time. This paper describes the movement from rural areas to urban areas, developing countries in developed countries and societies with difficult economic conditions in societies with better economic conditions to achieve their higher economic and social needs. A sample survey was conducted randomly, the three most important cities where the population was displaced were selected. The purpose of this study is designed to explore the social and economic determinants of rural migration in urban environments. The literature review has served us to provide the theoretical background in this study.

    Descriptive analysis shows that there are a number of reasons that push individuals to migrate from rural to urban areas. Restriction of economic opportunities is the main factor motivating individuals and families to migrate to urban areas.

    Deviating massive migration of individuals from rural areas to urban areas can be made by creating better economic opportunities.

Keywords: *Rural and Urban Areas, Migration, Social and Economic Factors, Inciting and Attractive Factors*

JEL classification: *R51, O15*

1   Introduction

Emigration has been one of the most dynamic features of transition in a country and one of the most important social and economic phenomena (King and Volunteer 2003). In particular, internal migration brought about a large urbanization

of some areas and a drastic depopulation of some others. Economic development leads to structural transformation, and as a result, the agricultural sector is declining while the industrial sector is increasing at the country's GDP. Based on the increasement of the industrial production, the employment opportunities in urban centers also have been increasing and people start moving from the agricultural sector at the rural areas to urban areas in search of better employment opportunities and better living conditions (INSTAT, 2010) . The phenomenon of urban population growth as a result of the massive movement of people in urban centers is referred to as urbanization . However, the movement of people from the agricultural sector into rural areas is not the only cause of urbanization. Another strong reason for the growing urbanization trend, particularly in developing countries, is the increase of the population. On the one hand, the urbanization process offers opportunities to develop a standard of living but on the other hand this process has also had some negative effects such as overcrowding, environmental pollution, as well as rise in crime and so on. Urbanization is a phenomenon that involves many developing countries and Albania is part of it. In recent years, the population of Albania and of different cities of Albania has increased significantly (INSTAT, 2015). The term of internal migration is used to describe the process of people moving from one area (a province, district or municipality) to another within the United Nations (Educational, Scientific and Cultural Organization of the United Nations, UNESCO). Another definition of internal migration is provided by the International Organization for Migration (IOM) in the Dictionary of Migration, a publication of key terms and concepts commonly used in the 2007 migration literature. According to this document, domestic migration is viewed as "movement of people from one region to another with the intention of living in a new location. Internal migration can be temporary or permanent. Domestic migrants can move within the borders of their country of origin (eg rural-urban migration). " (IOM, 2007, p. 35). Internal migration can be expressed in two dimensions: spatial and time dimensions. Spatial dimension refers to migration between two counties, two districts of the same district or two towns or villages. The time dimension describes whether this movement occurred at a certain point in the period between 2001 and 2016, as well as the exact year of the last movement, before arriving at the current residence. For the internal migration analysis we mainly rely on flow data, but there are times when considering the absolute change of the population. Specifically, the population change between 2001 and 2016 or the change from 1989 to 2016 can be considered as a reflection of migration.

Studies on internal migration have shown that most of the population is young, 46% of internal migrants are under the age of 30 and 6% of internal migrants

represent the retirement age (INSTAT, 2004). In terms of gender, 54% of the people who have migrated domestically are women, though this statistic varies with age (more women than men migrate at an early age). Some of the reasons that explain this trend are related to job opportunities in the market for young women in urban areas, gender-based traditions such as the lack of a future in relation to inheritance of family property in rural areas. (INSTAT, 2004). However, gender mainstreaming in internal migration can occur due to the fact that women tend to prefer short-term domestic migration while men choose long-term and multiple migration, from domestic to international migration. This recent trend makes it more difficult to identify the distribution of the male population in studies that examine domestic migration in Albania.

During the study of domestic migration in Albania it is important to consider the many factors such as the demographic elements and the employment situation of those involved in this process. Despite the fact that most internal migrants (84%) are relatively young (15 years-64 years), only 60% of this population works (INSTAT, 2004). In addition, the level of unemployment is higher among women (41%) than among males (23%). Women who find work after migration to another area within the country belong to two age groups: (15-19 years) and (40-49 yr) where the first group finds jobs that do not require training and skills while the second group is consisting of women who have advanced training.

By trying to understand the demographic dimensions of Albanian domestic migration, many conclusions can be reached. First, the majority of the population is young and this trend has an impact on the labor market 21 which has increased in host communities and has diminished in the communities of origin. Secondly, the male / female ratio in domestic migration is more balanced than the gender ratio in international migration (ie 1: 1 compared to 3: 1). In addition, coastal and central prefectures are often seen as the destination prefecture, while northern and northeastern prefectures are often the prefecture of origin.

The migration in Albania has always been an important phenomenon which is characterized by three phases. 1. The first phase (1950-1960), characterized by the communist strategy of accelerating the development of a secondary sector (industry and construction) more than the tertiary sector, domestic migration from rural to urban areas was controlled and oriented, but not totally prohibited. 2. The second phase (1961-1990) was characterized by a strategy of internal migration restrictions from rural to urban areas, proving, but without success, moving the population from rural to urban areas.

On the one hand this policy deepened the self-isolation from the outside world but on the other hand, the investment resources dropped drastically, for example, the process of economic and social development. 3. The third phase started in

1990, coincided with the transition period and was characterized by a lack of policies in terms of internal and international migration. During this period, as a result of changes in the country, control of the free movement of the population was abolished and urban areas, especially Tirana and Durres, compared to rural ones, were disproportionate. Out of rural areas, approximately 900,000 people migrated to urban areas inland to other countries as well. (INSTAT, 2001). People tend to move from rural to urban areas, from developing countries to developed countries, taking into account the multi-dimensional aspects, motives, or causes. The decision to migrate is due to certain factors such as certain deprivations, stress, restrictions, aspirations, motivation in the country of origin. Privileges have emerged collectively or by individuals when their needs are not met by existing conditions within a community. There are many economic, social and political and environmental factors that have caused migration, and they can usually be classified as "Supply Chain Management". The driving factors are those related to the field of origin (rural areas), while attractive factors are those related to the area of destination (urban areas) (Riley, 2011).

Push and Pull Factors of Migration

Push	Pull
Social Discrimination, Family Extension, Criminality	Family reunion, Commitments, Educational and Cultural Opportunities, Health Services
Political instability	Access to Public Services
Poverty, unemployment, sluggish economic growth, low wages	Employment and business opportunities, higher salaries, potential for better living standards
Degradation of the environment	Lack or high number of people, the quality of the environment

2   Methodology

This study was based on a specific purpose to describe the characteristics of internal migration in Albania and to identify the areas most affected by this phenomenon. Further, the study aims to identify the push and pull factors that led the interviewed people to the decision to migrate. The discussion was mainly focused on various aspects such as the scholastic study, the selection criteria for respondents, the construction of measuring instruments, the pilot or pre-testing study and the measures taken during the questionnaire development and the time to gather the corresponding responses during the survey. This study was planned to

explore the social and economic determinants of rural migration in the urban environment in Tirana, Durres and Vlore. The interviewing for each city was done through the targeted sampling methods, after the identification of the primary selection units, the study continued with the identification of families within these units. This process was based on random selection of households representing each primary selection unit. The inclusion criterion for this study was related to the selection of families migrating from rural to urban areas. Pre-testing is performed at twenty men to ensure the validity and accuracy of the interview program. After the pre-testing and the finalization of the interview program and the research activities in the field, then started the process of collecting data.

3   Results and discussion

Four trends in the population movement within the regions can be identified:

(1) people leaving the northern and northeastern regions (prefectures of Kukës and Dibër) and relocate to central regions;

(2) people from different parts of the country (prefectures of Berat, Korça, Elbasan, Gjirokastra, Shkodra) relocate to the center of the country;

(3) people from the coastal regions (prefectures of Fier, Vlorë, Lezhë) relocate to central regions;

and

(4) people from different parts of the country relocate to secondary coastline regions (INSTAT: 2004).

Part of the phenomenon of internal migration can be linked to poverty and lack of opportunities for economic growth in the areas of origin. For example, 40% of households in Kukës (Northeast Region) receive social support, while the national average of living standards was 12% (INSTAT, 2000).

As for the welcoming prefectures for migrants, Tirana ranks first, followed by Durres, Fier and Vlora. According to the 2001 population census, 72% of the people who migrated internally live in Tirana and Durrës (INSTAT, 2004). The population in these two prefectures increased by 41% and 12%, respectively. In addition, in 2001, 30% of the total population lived in these two areas, compared to 23% in 1989.

This complex and often irregular and chaotic internal migration is characterized by low levels of integration between host communities and newcomers, imbalance in infrastructure (water, electricity, roads) and the education and health system.

Characteristics of the population study

Before Migration
- Age group: 21-29 years
- Patriarchal Family
- 9-year education
- Household income: Less than 15,000 ALL
- Occupation: Engaged with agriculture

After Migration
- Age group: 21-29 years
- The Modern Family
- University education
- Household income: 20,000 ALL
- They do not deal with agriculture

Social and demographic economic characteristics of the respondents

- Interview data regarding the average age of respondents indicate that 64.2 percent of them were around the age of 27-35.
- Most migrant families belong to the young age group.

Now migration is a fact for qualified people, but also for those in qualification process. Low-skilled migrants are few among young migrants.

According to most interview data, respondents belong to the poorest class. This shows that most respondents migrate from rural to urban areas to meet their basic needs ie 70.0 percent of respondents reported that they had migrated from rural areas to urban areas due to the availability of basic elements such as work, education and good standard of living, which was not available in the village, while 30.0 percent had responded negatively.

The economic and social determinants of rural migration in the urban environment

Most of the respondents were young people over the age of 18, not very educated, with little work experience and with large families. As far as their economic status is concerned, most of them fall into the low income group. Most of the respondents have migrated to have higher incomes, get better education, and achieve a better standard of living.

Data shows that the majority of respondents, 60.8 percent of them, think that their financial situation has improved due to migration in cities and 39.2 percent of respondents were of the opinion that their financial situation is the same as the previous financial resources situation in the rural areas. When respondents were asked in the relevant interview to achieve the purpose or the cause of the migration, almost one third of the respondents about 73.3 percent gave positive answers regarding this statement and 26.7 percent of the respondents were not happy about their intentions to emigrate in relation to their achievement in different aspects of life.

4   Conclusion

Domestic migration can lead to the diminution of human resources and spark a sense of chaos in infrastructure. Key systems such as health, education and development sectors are highly affected, and government interventions should focus on on-going monitoring of the internal migration process to prevent the negative effects of these processes.

The descriptive analysis shows that inadequate education, low health, poor infrastructure and limited economic opportunities in rural areas were the main factors that motivate individuals and families to migrate to urban areas.

By the increasement of migration from rural to urban areas, various problems such as environmental pollution, road traffic, overcrowding, road accidents and crime are increasing. The government should provide better economic opportunities, better sanitation institutions, better health institutions, better education institutions, better infrastructure, better public transport, the promotion of the farming industry and the creation of industry in small village near the villages to divert the massive displacement of individuals from rural areas to urban areas.

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EFFICIENCY ANALYSIS OF SUBSIDIES FOR INVESTMENTS USING STOCHASTIC FRONTIER ANALYSIS: CASE OF SERBIA

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Abstract

Historically, a great number of countries worldwide used subsidies in order to promote or protect specific economic sector. With the process of globalization, Governments also began utilizing subsidies with the intent of attracting foreign direct investments. This practice has remained until today, when many countries, including Serbia, still use subsidies and other instruments (e.g. tax incentives) in order to encourage both foreign and domestic investments, increase employment and accelerate regional and technological development. Challenges and questions about optimal institutional design, minimal criteria that investors have to fulfill, optimal level of subsidies remain the same.

Bearing in mind the increase in expenditures on this type of subsidy in Serbia, there is a need to assess the efficiency of this policy. In this paper, it is done using stochastic frontier analysis (SFA). To the extent of the authors' knowledge, this is the first paper in which stochastic frontier analysis is implemented in an attempt to capture inefficiencies of subsidizing policy. The results show that there were potential budget savings that could have been achieved. In other words, there were some investment projects that were overpaid by the Government of Serbia. In addition, we believe that framework established in this paper could be used as a guide for future policy practice. In the end, suggestions are given for further research which would give broader and more precise results.

Keywords: *subsidies, state aid, FDI, efficiency analysis, stochastic frontier analysis*

JEL classification: *F21, F23,H25, C21, C51*

1 Introduction - topic relevance from international and domestic perspective

In the past, great number of countries worldwide utilized subsidies in order to promote or protect specific economic sector. With the process of globalization, Governments also began using subsidies as a mean of attracting foreign direct investments. This practice has remained until today, when many countries, including Serbia, still use subsidies and other instruments (e.g. tax incentives) in order to encourage both foreign and domestic investments, increase employment and accelerate regional and technological development. However, through the process of harmonization of national legislations [16], countries worldwide face with many challenges and questions - what is optimal institutional design for conducting subsidizing policy, what should be minimal criteria that investors have to fulfill, is there optimal level of subsidies, and the most fundamentally, should governments provide subsidies for investors.

Therefore, it is not difficult to conclude that this research topic is relevant from international perspective.

The reason why this topic is significant from domestic perspective is an increasing nature of expenditures on subsidies in Serbia in recent years. Therefore, a need to assess the efficiency of this policy in Serbia arises. In other words, there is a need to determine whether some investment projects were overpaid by the Government of Serbia, and what is more important, to identified the best policy practice, which would lead to increase in efficiency in implementation of this type of policy in Serbia and potentially worldwide.

In the next two subsections we will briefly explain international policy practice in selected Central and Eastern European countries[17] and the importance of analyzing the efficiency of subsidizing policy in Serbia.

1.1 International perspective – overview of selected CEE countries' policies

In the past few decades, the competition between countries has being intensified in terms of attracting foreign direct investments (FDI), due to the development of new technologies and the reduction of transportation costs that enabled the breakdown of the production process to a large number of parts and their

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[16] Since most of countries in the world are or want to be part of World Trade Organization or some other international union (e.g. European Union, NAFTA, ASEAN, etc.)

[17] We chose these countries since they are, according to the economic, political and geographically factors, comparable with Serbia.

organization and operationalization in different parts of the world (Harding and Javorcik, 2007). This is one of the reason why a very large number of countries have founded agencies for investment promotion. With the intention to encourage FDI, agencies offer various types of incentives and support. Direct subsidies are, in most cases, the most important type of incentives for attracting investors. There are usually two types of programs – one focused on employment and another one focused on investments. The amount of subsidy depends on various criteria established by each country or supranational body. In addition, a substantial number of countries offer various types of tax exemption, primarily from corporate income tax and personal income tax.

Numerous Central and Eastern European (CEE) countries use a variety of instruments to encourage direct investment, and incentives for investments and employment differ between countries (Table 1). In most countries, the maximum amount of incentives is set at 50% of the value of the eligible costs, which are the basis for calculating the amount of subsidies or other form of state aid[18]. The eligible costs can be the amount of investment or the amount of two year gross earnings. The amount of state aid depends on the development level of the region, and in line with that some countries do not offer any kind of incentive for the most developed regions or capital cities. Also, the amount of subsidy changes based on the industry to be invested in, and often on the number of employees. Thus, some countries offer additional incentives if the number of new employees exceeds a certain criterion.

Table 1 **Incentives and criteria for investment in selected CEE countries**

Type of Incentive, criteria and financial benefits	Bulgaria	Czech Republic	Hungary	Poland
Maximum amount of subsidies (% of eligible costs)[1]	50	0-25	0-50	15-50
Minimum investment (mln euro)	0.25-2	0.4-20	10-20	0.23-115

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[18]   According to the Law of state aid control (2009), state aid is defined as any actual or potential public expenditure or reduction of public revenues, whereby the beneficiary of state aid acquires favorable market position relative to its competitors, thus distorting market competition (or there is potential risk of distortion). State aid may be in the form of subsidies, loans under favorable conditions, state guarantees, tax incentives and tax exemptions, sales of public property under special conditions, by granting land in public ownership at a price lower than the market and others.

Type of Incentive, criteria and financial benefits	Bulgaria	Czech Republic	Hungary	Poland
Minimum number of new employees	10-150	20-500	50-100	35-750
Subsidies for investments (% of investment value)	10-50	10	4-10	2-10
Subsidies for employment[2]	YES[3]	3,700-11,000	up to 3 mln euros	800-3,700
Subsidy for training employees	YES	3,700-11,000	up to 3 mln euros	800-3,700
Income and profit tax release or reduction	25% of total costs	YES	0.5-2 mln euros	NO
Property tax exemption	YES	YES	YES	YES
Other tax exemption	NO	YES	NO	YES
Possibility to sell assets below the market price	YES	NO	NO	NO
Specific incentives	YES	YES	NO	NO

Type of Incentive, criteria and financial benefits	Slovakia	Romania	Croatia	Serbia
Maximum amount of subsidies (% of eligible costs)[1]	0-35	40-50	10-60	**50-70**
Minimum investment (mln euro)	0.1-10	10	5	**0.1-0.5**
Minimum number of new employees	40	10	50	**10-50**
Subsidies for investments (% of investment value)	10-20	YES	10-20	**10-30**
Subsidies for employment[2]	4,000-8,000	YES	3,000-15,000	**3,000-7,000**
Subsidy for training employees	4,000-8,000	YES	3,000-15,000	**3,000-7,000**
Income and profit tax release or reduction	NO	NO	UNKNOWN	**up to 1700 euros[7]**
Property tax exemption	YES	YES	UNKNOWN	**YES**
Other tax exemption	NO	YES	UNKNOWN	**NO**

Type of Incentive, criteria and financial benefits	Slovakia	Romania	Croatia	Serbia
Possibility to sell assets below the market price	NO	YES	UNKNOWN	**YES**
Specific incentives	YES	NO	UNKNOWN	**UNKNOWN**

[1] The percentage varies between countries, and depends on the region's development – the more developed region the smaller the amount of maximum state aid. In some countries, state aid in the capital cities (e.g. Prague and Bratislava) or certain regions (e.g. Central Hungary with some exceptions) is not permitted.

[2] Per new employee (in euros) except for Hungary, where the total value is given.

[3] In Bulgaria, all investors are exempt from paying salaries, taxes and contributions during the first year. [7] Per employee

Source: "Investment incentives in the chosen Central and Eastern European countries" (report by Polish Foreign Investment Agency, 2016), modified by the authors.

In practice countries use the following instruments to boost direct investment:
- Subsidies for investments;
- Subsidies for employment;
- Subsidy for employee training;
- Income and profit tax release or reduction;
- Property tax exemption;
- Possibility to sell assets below the market price.

1.2   Domestic perspective – growing expenditures for subsidies in Serbia

In the period 2006-2016, the Government of Serbia paid around 200 million euros or approximately 20 million euros annually for the program of subsidizing investors. Moreover, during this period the Government has obliged to pay additional 200 million euros in the following years. Since the new regulation was adopted in 2015, expenditures for subsidies have been steadily increasing. Our estimations show that if the Government continues with the same policy, the expenditures for subsidies will reach the level of 100 million euros per year (Graph 1). Partly, this is due to the rise in the number of investors, and partly it is a result of the increase in the amount of subsidies compared to the level of eligible costs. Bearing in mind the tendency of growth in subsidies, it can be concluded that investigating efficiency of conducted policy is of high importance for future policy-making practice in Serbia.

Graph 1 **Estimated total expenditures for subsidies per year (in million euros)**

Source: Development Agency of Serbia and authors' calculation.

2 Literature review

In the context of foreign direct investments there is growing number of papers that use stochastic frontier analysis as the main methodological framework. Research has been focused on the impact of FDI on productivity growth and technical progress, presence of spillover effects, and generally on economic growth.

Kathuria (2001) used techniques from a stochastic production frontier and panel data literature to test for the spillover hypothesis that presence of foreign-owned firms and disembodied technology import in a sector leads to higher productivity growth for domestic firms. The results indicated that there exist positive spillovers from the presence of foreign-owned firms but the nature and type of spillovers vary depending upon the industries to which the firms belong. Mastromarco and Ghosh (2009) used stochastic frontier analysis to study which of the three channels of technology diffusion - foreign direct investment (FDI), imports of machinery and equipment, or imports of research and development (R&D) expenditures, affect the total factor productivity of developing countries.

Wijeweera et al. (2010) estimated the relationship between FDI and the rate of growth of GDP using the same methodological approach, and found that FDI inflows exert a positive impact on economic growth only in the presence of a highly skilled labour. Yang (2015) has investigated the effect of foreign direct investment (FDI) and foreign trade on the efficiency of energy utilization of the Yangtze Delta region in China. The results show that FDI and foreign trade are both vital for

the improvement of the efficiency of energy utilization. Stack et al. (2015) used the single-step ML approach to stochastic frontier analysis, in order to estimate the location and variance determinants of FDI using the knowledge capital (KK) model framework. Finally, Wang and Wong (2016) explored how FDI affects a Chinese manufacturing firms' technical efficiency improvement as well as its technical progress in a stochastic frontier model.

Second line of research addressed two questions: whether subsidies and other types of incentives increase level of foreign direct investments, and whether benefits outweigh costs of subsidizing policy.

Blomstrom and Kokko (2003) suggested that the use of investment incentives focusing exclusively on foreign firms is generally not an efficient way to raise national welfare, arguing that spillovers of foreign technology and skills to local industry, is not an automatic consequence of foreign investments. Morisset (2003) reviewed a debate about the effectiveness of tax incentives and examined the benefits and the costs of using tax incentives to attract foreign direct investments. He concluded that the costs were large, while benefits appeared to be uncertain. Czech National Incentive Scheme is evaluated by Mallya et al. (2004) in terms of three interrelated issues: "crowding in" additional FDI, cost-benefit considerations and quality of investments. Her findings suggest that to some extent (at best 10%) "crowding in" effect exists and that Government of Czech Republic had been successful in increasing quality of investments. She also calculated social price of one new job created. Miroslava (2013) generally discussed positive and negative sides of investment incentives and her results, on the case of firms in Czech Republic, indicated that it was mainly effective to provide investment incentives.

In the literature, a disagreement among economists exists about whether subsidies can compensate for disadvantages in business environment or not. Cass (2007) analyzed to what extent transition countries employed financial incentives relative to each other and over time and what types of incentives they offered. He showed that the incentives were not compensating adequately for disadvantages in the business environment used as a strategic tool in international competition for export-oriented investments. On the other hand, Arsic (2010) compared subsidies and improvements in business environment as two ways to encourage investments and employment and argued that subsides present a costly and an inefficient way of stimulation of investments and employment and that they cannot compensate disadvantages in the business environment. Generally, conclusion is that investment climate is especially crucial for determining the effectiveness of incentives in attracting FDI. Moreover, it is suggested that the incentives should

be used minimally, mainly to address market failures, and should be granted through automatic legal criteria (James, 2013).

Papers and researches mentioned above have not captured possible inefficiencies in implementation of subsidizing policy, and generally, they were not written with the aim to investigate if some investment projects were overpaid by the Governments. To the extent of authors' knowledge, this is the first paper in which stochastic frontier analysis is implemented in an attempt to capture inefficiencies of subsidies for both foreign and domestic investments.

3 Subsidizing Policy in Serbia – overview and some identified irregularities

Since 2006, The Government of Serbia has started the policy of subsidizing investors. At that time, the law defined that the amount of subsidies per employee could not exceed 10000 euros. The allocation of funds was made through public calls, and the law defined criteria that were used to calculate the amount of subsidies. Subsidizing policy was suspended during 2013, and relaunched in 2014. During the period from 2006 to 2016. Government has signed more than 300 contracts and has obliged to pay around 470 million euros. On the other side, investors have obliged to invest more than two billion euros and employ more than 70 thousand people[19]. In the following table total **number of contracts, values of investments and subsidies and number of employees are given:**

Table 2 **Main indicators (2006-2016)**

Indicator	Including terminated contracts	Excluding terminated contracts
Number of contracts	307	209
Value of investments (in euros)	2,035,846,443	1,705,673,278
Number of employees	72,605	56,945
Value of subsidies (in euros)	467,795,948	407,507,448

Source: Development Agency of Serbia and authors' calculation.

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[19] During last ten years Government has terminated 98 contracts, mostly with domestic investors, since they could not fulfill obligation from contracts they signed.

Currently, similarly to other countries, potential level of subsidy that one investor can get depends on the level of development of the municipal government[20] (Tables 3 and 4), as well as whether it is a project in the manufacturing sector or in the service sector[10]. There is an exemption from paying corporate income tax for investors if they invest over nine million euros and employ at least 100 workers. Another kind of incentive for investors is a reduction in the payment of contributions and income taxes (from 65% to 75%, depending on the number of employees). An additional advantage to investors is exemption from paying value added tax if they start production in one of the free zones. Also, foreign investors are exempt from paying customs duties on imports of machinery and equipment, as well as raw materials and semifinished products from abroad if their finished products are fully exported.

Table 3 **Incentives for projects in manufacturing sectors**

Degree of development of municipality[1]	I group	II group	III group	IV group	Devastated areas
The minimum number of employees	50	40	30	20	10
Minimum level of investment (in euros)	500.000	400.000	300.000	200.000	100.000
Subsidies for investments (% investments)	10%	15%	20%	25%	30%
Subsidies for employment (% two year gross earnings)	20%	25%	30%	35%	40%
The maximum subsidy (per employee)	3.000	4.000	5.000	6.000	7.000

[1] Applying the basic and corrective indicators, all units of local government are divided into five groups. The first group consists of local governments whose level of development is above the average in the country; second group consists of local governments whose level of development ranges from 80 to 100% of the country average; the third of local governments with a degree of development ranging from 60 to 80% of the national average, and the fourth of

[20] The development degree of local government is defined by the Ministry which has authority under local governments and it is determined by applying a basic and corrective indicators. The basic indicator is the sum of the salaries and pensions in the unit of local government and the revenues of the budget of the local government unit after the exclusion of funds received from another body in the name of removing the consequences of extraordinary circumstances, expressed per capita. Corrective indicators are demographic growth or decline, unemployment rate and level of education of the population. (Gnjatovic, 2016) [10] Only products which can be the subject of international trade are included.

local governments with a degree of development below 60% of the average. Additionally, local governments whose development level is below 50% of the national average are classified as a group of devastated areas. (Gnjatovic, 2016)

Source: Development Agency of Serbia (Available at: http://ras.gov.rs/podrska-in-vestitorima/zasto-srbija/podsticaji-za- investiranje).

Table 4 **Incentives for projects in service sectors**

Criterion	Value
The minimum number of employees	15
Minimum level of investment (In euros)	150.000
Subsidies for investments (% investments)	20-40%
The maximum subsidy (per employee)	3.000-7.000

Source: Development Agency of Serbia (Available at: http://ras.gov.rs/podrska-in-vestitorima/zasto-srbija/podsticaji-za- investiranje).

In our analysis, we have identified some irregularities in implementation of subsidizing policy which motivated us to investigate potential inefficiencies. First of all, the structure of investments by regions is unfavorable, despite that fact the current policies encourage investments in less developed regions[21]. The largest number of investments, more than 80%, measured by the number of projects, employees and the level of investments, is located in first and second group of local governments. Moreover, the value of subsidies per employee is not higher for a less developed municipality as it could be expected. Average subsidy per new employee for the investment projects in the first group is more than 2000 euros higher than the average subsidy per new employee for the investment projects in the last group (Figure 1).

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[21]   See Table 3 (especially last row).

Figure 1 **Average subsidy per employee (in euros)**

Source: Development Agency Of Serbia And Authors' Calculation.

Secondly, present of a strong positive correlation between the value of the subsidy per employee and the average gross salary was expected, since the former presents the average costs for the Government and the latter the basis for future budget revenues (taxes, social contribution etc.). However, we have noted the lack of correlation[22] between the value of the subsidy per employee and average gross salary (Figure 2).

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[22] In our calculation, correlation was even slightly negative.

Figure 2 **Relationship between average gross salary and subsidy per employee (period 2015-2016)**

Source: Development Agency of Serbia and authors' calculation.

4 Methodology

The main methodological framework used to capture the inefficiencies of government subsidies is stochastic frontier analysis (SFA) popularized by Meeusen and van den Broeck (1977) and Aigner, Lovell and Schmidt (1977). Extended survey of papers which utilize SFA can be found in Greene (2012).

According to Belotti et al. (2013), the stochastic frontier model is motivated by the theoretical idea that no agent is able to exceed the ideal production frontier, or go beneath the ideal cost frontier, and the deviations from these extremes represent individual inefficiencies. From the statistical point of view, this idea has been implemented by specifying a regression model with a composite error term ε_i comprising the classical idiosyncratic disturbance , aiming to capture measurement error and other noises, and a one-sided disturbance u_i that represents inefficiency. Terms v_i and u_i are assumed to be independent of each other and independently and identically distributed across observations. These regressions are usually estimated using likelihood-based methods assuming certain distributions of both constituents of the composite error term, and we will be consistent with this practice. We consider the following model:

$$Y_i = \beta_0 + X_i\beta + \varepsilon_i \ (1)$$

$$\varepsilon_i = v_i + u_i$$

$$v_i \sim \left(0, \sigma_v^2\right)$$

$$u_i \sim F$$

where $_i$ = 1,2 … n. We assume that the cost is defined by the Cobb-Douglas cost function. Therefore Y_i represents the logarithm of the cost (or the subsidy amount) of the *i-th* government subsidy contract, and X_i is a vector of logarithm of outputs (namely, investments promised by the receiver, number of employees arranged by the contract, etc.)[23]. We have also considered other specifications such as the translog, half-log, exponential and linear cost functions, but according to the Bayesian information criterion (BIC) the former is the optimal specification for the dataset at hand.

In order to make the equation estimable, we have to assume the distribution function F of the one sided inefficiency term . Aigner et al. (1977) consider a half-normal distribution, $u_i \sim N^+(0, \sigma_u^2)$, while Meeusen et al. (1977) opt for an exponential distribution $u_i \sim \varepsilon(\sigma_u^2)$. Other adopted distributions include the truncated normal in Stevenson (1980) and gamma distribution in Greene (1980). In our analysis we choose the exponential distribution as the prevalent option in literature and as it is best fitting to our model according to the BIC holding the specification constant. The model can be represented in the equation:

$$lnSub_i = \beta_0 + \beta_1 lnEmp_i + \beta_2 lnInv_i + \beta_3 Amb_i + \beta_4 Reg_i + \beta_5 Rec_i + v_i + u_i \ (2)$$

where
$$lnSub_i$$
$$lnEmp_i$$
and
$$lnInv_i$$
are the natural logarithms of the subsidy amount, number of employees and the invested amount implied by the *i-th* contract, respectively.
$$Amb_i$$
and
$$Rec_i$$
are dummy variables that are included in order to control for the changes in the business environment. Former takes the value of one if the contract was signed after 2013, since Serbia achieved a significant improvement in the period after 2013 according to the Doing business metric[24]. Latter is equal to one if the contract was

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[23] From the Government's point of view, every investment projects can be seen from input-output perspective, where subsidy presents input (what the Government "invests") and amount of investments, number of employees and municipality development level present output (what the Government gets).

[24] http://data.worldbank.org/data-catalog/doing-business-database

signed in the years in which both the EU and Serbia were in recession that is in 2008, 2009, 2011 and 2012.

Reg_i

is a dummy variable used to control for the lower subsidies across regions. It takes value of one if the contractor company is stationed in the second region defined by the subsidy regulations. Formally, there should be a difference in subsidy amounts in all four regions, but we only found the second region to be statistically different in respect to others.

Model is estimated using the maximum likelihood method assuming the mentioned distributions for the random terms in the equation in the first step. Hence, the distribution of the composite error is just a convolution of the two component densities defined by:

$$f_\varepsilon(\varepsilon_i) = \int_0^{+\infty} f_u(u_i) f_v(\varepsilon_i + u_i) du_i \ (3)$$

Therefore, the log-likelihood function for the sample of n units is:

$$l(\theta) = \sum_{i=1}^n log f_\varepsilon(\varepsilon_i \mid \theta) \ (4)$$

In the second step from the estimated residuals $\hat{\varepsilon}_i$ we isolate the inefficiency term from the idiosyncratic term using the conditional distribution

$$f\left(u_i \mid \hat{\varepsilon}_i\right),$$

where. $\hat{\varepsilon}_i = Y_i - \beta_0 - X_i \beta$

As proposed by Jondrow et al. (1982), estimate of the inefficiency for the i-th contract will be given by $\hat{u}_i = E\left(u_i \mid \hat{\varepsilon}_i\right)$. Furthere, estimate of the cost inefficiency score is equal to:

$$Cost_i = e^{ui} \ (5)$$

The non-transformed model is defined as:

$$Sub_i = \beta_0 Emp_i^{\beta_1} Inv_i^{\beta_2} Amb_i^{\beta_3} e^{\beta_4 Reg_i} e^{\beta_5 Rec_i} e^{v_i} e^{u_i} \ (6)$$

so the final factor is actually equal to the cost inefficiency score. Given that, the estimate of the cost inefficiency will be equal to the amount by which the subsidy was overpaid solely due to inefficiencies holding outputs constant. Using this fact, we are able to extract the total amount that could have been saved, had the regulations and/or decision makers been perfectly consistent with the established regulation.

As Kumbhakar and Lovell (2003) stress, neglected heteroscedasticity in the composite error term may affect inference in SFA models as well as lead to biased estimates of the inefficiency terms. Since the Glejser and White tests show that

heteroscedasticity is present in the composite error, we find it justifiable to assume that heteroscedasticity can exist in either of the components or both at the same time. Glejser tests has shown that composite error variance varies only with the change of value of $lnInv_i$. Having that in mind, we try to control for the heteroscedasticity in one or both terms using the natural logarithm of investments as the exogenous factor, as suggested by Hadri (1999) and look for the specification that maximizes the BIC. Highest information criterion value is given for the model defined above with $lnInv_i$ included to control for heteroscedasticity in the idiosyncratic term . Inclusion of other regressors in equations that parametrize the variances of distributions of both terms was considered, but only the investments yielded statistically significant effects in the mentioned case.

Thus the final model can be rewritten as:

$$lnSub_i = \beta_0 + \beta_1 lnEmp_i + \beta_2 lnInv_i + \beta_3 Amb_i + \beta_4 Reg_i + \beta_5 Rec_i + v_i + u_i \quad (7)$$

$$\sigma_u^2 = e^{\alpha_0}$$

$$u_i \sim \varepsilon\left(\sigma_u^2\right)$$

$$\sigma_{v_i}^2 = e^{\gamma_0 + \gamma_{lnln} v_i}$$

$$v_i \sim N\, 0, \sigma_{v_i}^2$$

5   Results and discussion

We estimate the model on the available sample of 307 contracts[25] signed in Serbia in the period 2006-2016. Estimated stochastic frontier and the inefficiency model are given in the following tables.

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[25]   We have also included the terminated contracts in the estimation of the stochastic frontier.

Table 5 **Estimated stochastic frontier**

Variable	Coeff.	S.E.	z	p-value
$lnEmp_i$	0.965835	0.031461	30.7	0.000
$lnInv_i$	0.022306	0.007679	2.9	0.004
Reg_i	-0.13963	0.068554	2.04	0.042
Amb_i	0.511468	0.084249	6.07	0.000
Rec_i	0.221017	0.07887	2.8	0.005
const	7.707289	0.253684	30.38	0.000

Table 6 **Inefficiency model**

Term	Variable	Coeff	S.E.	z	p-value
u_i	α_0	-3.15783	0.552966	5.71	0.000
v_i	γ_0	-9.81899	1.35465	7.25	0.000
	$lnI\ v_i$	0.554888	0.08873	6.25	0.000
Wald $\chi_5^2 = 1912.58$ (0.000), $log\,(\theta) = -216.212$					
	σ_u	0.206199	0.057011	3.62	0.000
	$E(\sigma_{v_i})$	0.48214	0.462031		

Mean $inefficienscor = 1.240$

Observing the values of the estimated parameters for the variables

$$InEmp_i$$

and

$$InInv_i$$

the large discrepancy of the influence of the same relative increase in the number of employees and the increase in the invested amount becomes apparent. Namely, the one percent rise in the number of employees yields 0.966% higher subsidies, *ceteris paribus,* while on the other hand the same rise in the invested amount would elevate the subsidies by only 0.023%. Considering this fact, one could become suspicious of the Government's willingness to improve the regional or the total economic development. Rather it is possible that the subsidizing policy is

used primarily as a means of achieving the goal of acquiring broader public support and affirming its position as a "job-creator" during the turbulent political period following the collapse of Yugoslavia characterized by high unemployment rates. We find that the influence of an increase of 1% in investments on the amount of the government subsidy is less than 50 times lower than the influence of the same change in the number of employees. Lagrange ratio test yields the statistic of LR = 0.18 for this restriction which has a p-value of 0.674.

Mean inefficiency score suggest that the average inefficiency across observations is around 1.24. However, this information can be a little vague. Considering that the inefficiency score measures by how much the subsidy was overpaid for the same level of output, it would imply that had the Government been more efficient in giving subsidies, expenditures could have been lower by about 19.35%. However, this is not completely precise taking into account two things. Firstly, when calculating these scores, the contracts that have been terminated and thus will have the subsidized amount reimbursed have been included. There have been 98 of these observations, and they should not be present in the calculation of the total potential savings. Secondly, to acquire the true mean inefficiency, the scores should be weighted by the subsidy amounts. Hence, we calculate the amount spent on contract i solely due to inefficiencies as:

$$Potential\ savings_i = (1) - \frac{1}{Inefficiency\ score_i}\ (8)$$

Sum of individual potential savings of non-breached contracts amounts to 86,285,542.62 euros, and taking into account that the total subsidy expenditure for these contracts was 407,511,174 euros, the total saving potential was 21.117%, assuming perfectly consistent policy implementation.

Graph 2 **Histogram of the inefficiency coefficients**

On the histogram (Graph 1) we see that most potential savings lay between 10% and 30% with two outliers of potential savings with over 70% and one under 2%. Two observations that have high inefficiencies have a savings potential of 72.392% and 73.977% and have received 853,498 and 2,250,000 euros in subsidies while managing to open only 24 and 27 new workplaces respectively. These amount to 35,562 and 83,333 euros of subsidies per new workplace, and considering the regulation, their high inefficiency scores are expected. On the other hand, one company which helped employ 1350 workers was granted 4,000,000 euros had the savings potential of only 2%.

6   Conclusion

A great number of countries in the world, including Serbia, use subsidies and other instruments (e.g. tax incentives) in order to encourage both foreign and domestic direct investments, with the aim of increasing employment and accelerating regional and technological development. Today, these countries face with economic, political and institutional challenges in conducting subsidizing policy. Bearing in mind the increase of amount for expenditure on this type of subsidy in Serbia, there was a need to assess the efficiency of this policy.

After brief discussion about topic relevance from international and domestic perspective, subsidizing policy practice in Serbia has been explained. What is more important, some irregularities in implementation of subsidizing policy have been identified. Specifically, we found that the value of subsidies per employee is not higher for a less developed municipality as it could be expected. We have also noted the lack of correlation between the value of the subsidy per employee and average gross salary, which is opposite from what is expectable.

In the fourth part, we used stochastic frontier analysis as a framework for capturing inefficiencies in implementation of subsidizing policy. The results showed that there were potential budget savings that could have been achieved. In other words, there were some investment projects that were overpaid by Government of Serbia. We estimated that Government of Serbia could have saved approximately 21% of allocated budget funds for subsidies, which is about 86 million euros. This amount of money has even more important value since Serbia has gone through the process of fiscal consolidation. Having that in mind, we believe that our Government can use our model as a guide for future policy practice, in order to estimate what is optimal value of subsidy that potential investor should be granted.

Finally, there are possibilities for further research. Due to the lack of data for expenditures of other countries, only "internal" efficiency of policy which has been conducted by the Government of Republic of Serbia for the last ten years

was analyzed using an appropriate SFA model. In other words, we only compared investment projects that have been located in Serbia. In the future, if the data are available, it will be also possible to compare policy practice in

Serbia with practice of other countries and estimate potential "external" inefficiencies and identify what is the best policy practice and institutional design. This will possibly help governments in Europe and wider, to improve their policies and increase their efficiencies in implementation of this type of policy.

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EXPORT BARRIERS AND EXPORT SUPPORTING MEASURES – LESSONS FOR A POLICY REVISION IN SERBIA

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Abstract

After the crisis 2007-08 new ideas on further institutional reforms and new development path for transition economies have been proposed. Among these new ideas, one of the leading tracks was promotion of the export led growth. The idea includes definition of an industrial policy that should back the new growth model based on exports. Although proclaiming new policies it often happened that governments remained mostly at some conventional measures. In this paper we try to define what kind of policy will be desirable to diminish problems the firms feel to face in developing their export businesses. We analyze results of a survey taken in a sample of Serbian firms trying to identify export obstacles and barriers as they are perceived among the managers of the firms observed. We explore three groups of export barriers: external, operational and internal (organizational and marketing) barriers. Our analysis will be concentrated on several characteristics of firms in the sample. In doing so we shall try to define what their common perception of export obstacles and barriers is and what is specific in regard to a particular firm type. The firm types and other firm characteristics we are interested in refer to (a) size of firms; (b) export experience and (c) firm location. The results should help policymakers to design proper policies that can efficiently relax detected obstacles and barriers (regardless of whether they represent an objective problem or just a subjective perception of firms' managers). Also, the findings could be of use for individual managers when rethinking their own views either as a confirmation of their thoughts or as an inducement to call for some collective action. Hence, the main outcomes of our research is the identification of those critical points that could help in designing correct and effective policy measures or incite certain rethinking when the measures appear as insufficient but also to offer some lessons for the managers in their work.

1   Introduction

A full decade after the financial crisis hit the big part of the world including still institutionally fragile transition economies of that time; a new idea on development model based on export led growth became a common concept for these countries. The new paradigm had to change a spontaneously established model during the period of recommended (sometimes even forced) transition reforms guided by liberalization, privatization and deregulation in general. It also implied a disclosed industrial policy which had to back, support and initiate export activities on a broader scale within transition economies.

However, these new tasks of governments did not always enter the practice without some difficulties. The conducted policies were often constrained by a narrow set of conventional measures and followed by some hesitation in undertaking more definite or more adaptive measures in regard to actual circumstances. Thus, the results were below desirable level leaving firms with an impression that they remained alone in setting up ways to foreign markets and in coping with foreign competitors.

Based on these facts the objective of this paper is to shed more light on the principal constrains for export activities as perceived by firms in Serbia.[26] In doing so we make an attempt to identify main areas where government export promotion programs would be necessary and to mark main types of programs that could prove effective under the present circumstances and/or mark those projects that should be modified and changed.

After a brief introduction the paper is organized in four sections. The first one discusses the issue of export promotion programs and analyses main features of Serbian exports after the crisis eruption in 2007-2008. It is followed by a section that presents key methodological characteristics of the research. In the next section some selected results obtained are offered together with a brief discussion. Finally, we present certain conclusions and policy recommendation derived from the results obtained and conducted analysis.

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[26]   The paper is an extended analysis of the research partially presented in the paper Mitic et al. (2017).

2 National export promotion programs and Serbian exports

National export promotion programs are common government measures for supporting export activities of domestic firms often in order to enhance a desirable export led growth. These programs can be seen as an external resource, which firms can use to develop their knowledge, competencies and foster internationalization (Gengtiirk & Kotabe, 2001). The importance of export promotion program is very often analyzed from the perspective of small and medium enterprises (SME), since they have limited internal resource, often insufficient for implementing some broader international activities. On the other hand, World Bank recommends that government program should be oriented toward large firms (Lederman *et al.* 2006). Large firms have greater production and organizational capacity, which suggests that supporting them can have stronger impact on export on national level if compared with investing resources in supporting large number of small firms. Despite clear logic of targeting large firms, there are successful examples of export growth which is led by small and medium firms like in Italy. The case of Malaysia is also interesting, where the national export strategy was based on linking SME with large and multinational companies particularly in special export production zones. This strategy did not only fostered internationalization and increased export, but also helped SME in developing sustained competitive position through knowledge transfer and learning within the network (Williamson C. N., Kshetri B. N. & Wilkinson J. T., 2011).

Since export promotion programs can have strategic importance for export growth and export competitiveness of a country, especially in the case of emerging markets (Williamson C. N., Kshetri B. N. & Wilkinson J. T., 2011) the real potential of countries should be fully understood and exploited. Undoubtedly, the effectiveness of export supporting programs depends on specific firms characteristics (prior export experience, organizational, marketing and production capabilities…) and on their particular needs in development and implementation of an export business strategy. Rational use of scarce resources on macro level should take into account these specific features of firms by designing some prerequisites regarding development of export supporting program. They should be shaped accordingly to the needs of firms and in domains where firms perceive main problems in attempting to increase export sales. By investigating specific attitudes and understanding of firms regarding export obstacles in our research, we try to find what are the main issues that can be improved through government export supporting programs.

We find this analysis particularly challenging since Serbian government uses a relatively huge amount of subsidies for programs that could enhance export activities (approximately some euro 80 mill. spent in attracting foreign investors to come to the country and around euro 8 mill. for SMEs support). However, all that money is distributed in a very much diversified way with no clear strategy or policy that will indicate what investors and what sectors have priority according to their competitiveness and export potentials and which investments could result in an optimal way.

On the other hand it should be pointed out that exports have increased since 2008 i.e. after the overall crisis stroke the country: in the period 2007-2017 rate of growth of export was 19.3% and in the period 2009-2017 it was around 12%. These rates are well above growth rates for GDP in Serbian economy that is on average almost stagnant over the after-crisis period. This has resulted in a growing share of export in GDP yet accompanied with slower import growth with an overall effect in export-import ratio of 77.4% (towards 71.2 in 2013 and 47.6 in 2007). These facts indicate a certain switch in growth model, which was predominantly import based before the crisis. It is also interesting to remark that this rise in exports was very much different if compared with the one forecasted by the World Bank (which should not be a big surprise looking generally on the WB papers) that was based on metallurgy with its core firm US Steel, Smederevo[27] and on car manufacturing, namely new Fiat plant in Kragujevac[28] (see World Bank, 2012). As to the growth model change, unfortunately, we cannot speak about a kind of a designed or specifically focused policy moves in accomplishing the new model generated on growing exports. In reality, export activities were primarily pushed up (while import was narrowing) because of poor and diminishing purchasing power in local markets – in search for new customers exports increased but was diversified in a suboptimal way. Also, the exports were pushed by new investments from abroad that were, from the very beginning, attracted by low labor costs in the country yet subsidized by the government and were never interested in local market or in a developing cooperation with domestic firms.

As to the export destinations there were not very remarkable changes. From the table below (Table 1) one can conclude that there are several principal markets for Serbian exporting goods and services. Basically the main market is the EU but its growing share is sometimes connected with the EU enlargement more than Serbian export expansion. Conversely, we remark that within the EU appear a few

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[27] Needless to say that soon after this fine forecast US Steel has left operations in Smederevo that is, sold the mill to Serbian government for 1 dollar!

[28] The forecast for Fiat was much better but despite high exports (simultaneously followed by high imports) the rates of growth were very much below expectations.

markets with stable and/or slowly raising shares in total exports – the case of Italy and Germany that make together 25.7% of all exports in 2017 (vs. 24.2% in 2007) with some growth primary towards Germany (from 10.7% in 2007 to 12.5% in 2017). The second important market is the former Yugoslav market but with a diminishing share from above 30% in 2007 to somewhat higher than 23% in 2017. One may also remark that with growing exports some of other neighbor markets are raising its importance for Serbian exporters (namely, Romania, Bulgaria and Hungary) while traditionally important Serbian foreign market in Russia is somewhat stagnant with a relatively small share in total exports particularly if seen from the standpoint of its size.

Table 1 **Top ten Serbian export foreign markets (% of total exports)**

Countries	2017	Countries	2013	Countries	2007
Italy	13.2	Italy	17.4	Italy	12.4
Germany	12.5	Germany	11.9	Bosnia and Herzegovina	11.8
Bosnia and Herzegovina	8.1	Bosnia and Herzegovina	8.9	Montenegro	10.7
Russian Federation	5.9	Russian Federation	6.9	Germany	10.6
Montenegro	4.8	Romania	5.6	Russian Federation	5.1
Romania	4.8	Montenegro	5.1	Macedonia/FYROM	4.9
Bulgaria	3.9	Macedonia/FYROM	4.1	Slovenia	4.6
Macedonia/FYROM	3.7	Slovenia	3.2	Croatia	3.7
Croatia	3.7	Croatia	3.1	Austria	3.4
Hungary	3.6	France	2.8	France	3.3

Source: Serbian Statistical Office, 2018.

The basic groups of export goods demonstrate a modest change over time since tools and machinery constitute 11.1% of export in 2017 (2007 it was 7.3 and 7.8in 2013) with a diminishing share of materials for reproduction and raw materials (55.5% in 2017 from 65.5% in 2007) and increasing share of consumables (33.4% from 27.2%).[29] Looking in more detail one may recognize certain changes in export structure that cannot be assessed as desirable. Thus, for example, the leading export items have changed from motor cars (in 2013) that diminished their share

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[29] ver, this changes that could seem relatively robust in a ten year period are rather unstable since consumables reached 39.5% and materials fell to 52.7% in 2013 but did not constitute a permanent increasing and decreasing trend respectively.

in exports to wiring sets for motorcars and other means of transportation (in 2017), which is a production connected with predominantly non-skilled workers and with low value added (see Table 2). Moreover, this is in consequence of the government policy oriented to subsidizing foreign investors according to a number of employed people that proved the most attractive for the labor intensive production particularly the one employing low skilled labor.[30] The second important change among ten leading items shows a switch towards lower technology levels: increase in exports of tires, metals, cigarettes, raspberries, paper etc. The changes in their shares have various reasons (higher price of copper, renewal of the Smederevo steel mill under new owners – Hesteel, China, upgraded production of tires etc.), while somewhat smaller share of agricultural products, as well as the textile items, is partially due to the increase and further diversification of exports.

Table 2 **Top ten external trade items in Serbian exports (in %)**

Products categories	2017	Products categories	2013
Ignition wiring sets of a kind used in vehicles, aircraft or ships	4.6	Motor cars, diesel or semi-diesel, of a cylinder capacity not exceeding 1500 cm^3	4.9
Motor cars, diesel or semi-diesel, of a cylinder capacity not exceeding 1500 cm^3	2.6	Motor cars, diesel cylinder capacity exceeding 1500 cm^3, = <2500 cm^3	3.2
Tires, new pneumatic, used on motor cars	2.5	Maize, other	3
Refined copper	2.1	Ignition wiring sets of a kind used in vehicles, aircraft or ships	2.9
Motor cars, with spark-ignition internal combustion reciprocating piston engine,>1000=<1500cm^3	1.9	Motor cars, with spark-ignition internal combustion reciprocating piston engine,>1000=<1500cm^3	2.8
Flat-rolled products of iron or non-alloy steel, hot-rolled, not clad, of a width>=600mm,in coils	1.8	Parts, n.e.c., suitable for use with the machines falling within group 716	1.7
Maize, other	1.6	Tires, new pneumatic, used on motor cars	1.7
Cigarettes containing tobacco	1.4	Raspberries, frozen, without sugar	1.6

[30] The subsidies amount frequently goes well above two year wage in these factories where workers - yet primarily women - are paid at the lowest rates that do not exceed 200 euro per month.

Products categories	2017	Products categories	2013
Raspberries, frozen, without sugar	1.4	Other panty hose and tights, knitted or crocheted	1.3
Paper and paperboard, coated, impregnated or covered with plastics, other	1.3	Paper and paperboard, coated, impregnated or covered with plastics, other	1.2

Source: Statistical Office of the Republic of Serbia, 2018.

Diversification of exports could be demonstrated by the following figures. In 21 out of 23 sectors in the field manufacturing (C), according to NACE two digit classifications one will encounter some exporting activity. Regrettably, within these sectors of manufacturing, which makes around 70% of all exports, the majority of products come from factories with lower technological level (56.8% low and medium low tech; 39.6% medium high tech of which around 40% comes from one only *Fiat* automobile plant and 3.6% high tech – pharmaceutical and computer, electronics, and optical products). This is to show that the rise in exports – including rise in export of consumable goods as well as higher exports realized by foreign investors (through either acquired and/or newly established firms), rising diversification and other largely spontaneous processes – did not necessarily lead to an expansion in exports of goods with higher value added. For that reason the question concerning success and aims of export supporting programs and their relation with subsidy programs targeting foreign investors could be put up once again[31].

The broad and probably suboptimal diversification but also the latent possibility to increase exports in Serbia can be additionally confirmed looking at the product in question. Analyzing four digit SITC (Standard international trade classification) we shall reveal that in the period 2007-2016 export valued more than 1 mill. euros increased from 43 to 78 products and from 25 to 51 with export value higher than 10 mill euros. Especially active (apart from bigger and foreign firms) are *de novo* companies, usually relatively small but fiercely struggling for their place in the market or searching for some *nishas* that could be taken in a foreign market. Moreover, it was remarked that the share in total exports of big firms is diminishing on the account of small even micro firms whose export growth rate are smaller but the rate of entry into exporters club is rising rapidly.[32]

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[31] he figures quoted in this passage come from a preliminary working paper of CEVES (Center for advanced economic studies) analytical staff (CEVES, 2018)

[32] *id.*

3   Methodology

In order to identify what obstacles and barriers perceive managers of Serbian firms regarding export activities we have conducted a survey with a list of various types of potential export barriers and obstacles that was offered to responders. Firms' managers had to assess the offered list of barriers concerning their importance, in the range from1 – non important to 5 – highly important. Together with the list there was a question about various organizational characteristics and export strategy of the responding enterprises. Relying on the snowball method that was the only available one regarding the means at our disposal we composed a sample of 98Serbian firms. The survey was conducted during 2015 and 2016. The questionnaire was responded by marketing managers or general managers and/or firm owners (in case of small firms). We have complemented the received answers with data from the Serbian Business Registers Agency.

The sample included61.2% of small firms, 21.4% of medium and 17.3% of large firms. Regarding export experience the sample consists of 86% (or 85.7%) firms involved in at least some export businesses (exporters, further on) and 14% (14.3%) of non-exporting firms (non-exporters). We tried to differentiate export experience based on several criteria: (1) type of exporter (whether the observed firms are sporadic or persistent, regular exporters); (2) export intensity (based on share of export sales revenues in total sales revenues); (3) main export destination. As an additional characteristic of firms we analyzed location of a firm (whether it was located in capital city or in other locations), which we found to be interesting from the standpoint of availability of government supporting programs.

Thus, we finally have in the sample:

- 55% of regular exporters, 31% of sporadic ones and 14% of non-exporters; 45.6% of firms with export intensity of less than 1/3 of sales revenues from abroad in total sales revenues, 25.3% with export intensity between 1/3 and 2/3 and 29.1% with export intensity higher than 2/3;
- for 41% of firms main export markets are former Yugoslav countries, for 37.3% of firms main markets are EU countries and 21.7% of firms specify former Soviet countries (and other) as main export destination;
- 51.5% of firms in the sample are located in Belgrade, the capital city and 48.5% in other locations.

4   Survey results – export barriers perceived

Under the term barriers to exporting we understand "any attitudinal, structural, operative or other obstacles that hinder or inhibit companies from taking the

decision to start, develop or maintain international activity" (Leonidou, 1995). These barriers can be structured in two groups (Leonidou, 1995) (a) internal and (b) external; or in four groups: (Katsikeas and Morgan, 1994): (i) external (primarily macro-level factors like currency devaluation, high relative cost of financing exports, bureaucracy within public agencies, lack of government support, ineffective national export promotion programs, and additional problem of foreign competition), (ii) operational (micro-level factors of export activity connected to complex requirements in the export documentation process, payment issues, logistical constraints etc.), (iii) internal (controllable issues from inside the firms like product considerations, organization of export departments, lack of competent personnel) and (iv) informational barriers. In our research we developed a list of export barriers based on Katsikeas and Morgan's classification (Table 3). All export barriers have been structured in four groups: external, operational, organizational and marketing barriers. We shall firstly present results on how the firms perceive these basic groups in general and then we shall analyze, in more details, differences in barriers perception of various firm types, based on their organizational and export characteristics.

It is important to point out that Serbian firms recognize external barriers as main export barriers that is, barriers that predominantly are not under the control of firms. They got an exceedingly higher mark concerning their significance when compared with the other three groups of obstacles (average mark 3.69 compared with 2.79 to 3.25 for other groups). Among them dominates the problem of insufficient government support (mark 4.06) and is perceived as a more blocking issue than, for example, strength of international competitors (mark 3.94).Such an assessment is additionally supported by the fact that in the sample only 7 firms, which is less than 10% of all firms observed have been involved in some government export support program.

Marketing barriers appear as the second most important obstacle for exports (mark 3.25). Among marketing barriers, those which are primarily assessed as export obstructing are lack of price competitiveness and incapability of fulfilling necessary quality standards (3.68 and 3.63 respectively). Having in mind that firms recognize external barriers as the most frustrating such an assessment regarding marketing insufficiencies and/or incapability show a certain level of rationality and self-criticism pointing at some deficiencies within the firms. On the other hand this can only strengthen their general assessment about inadequate government care even under claimed growth supporting policies and point at the fields where some government support will be particularly welcome. Finally, responders in the survey put the group of operational barriers in the third place among export obstructing factors, underlying problems of high transportation

costs and payment difficulties in foreign operations. As a group of barriers with the lowest average mark comes a group of organizational barriers, with highest importance given to deficiency of skilled workers for export businesses and low commitment to exports.

After overviewing general of firms' perception, we try to analyze and define some possible differences in perceiving export difficulties among the firms of various size, export experience and location. The results reveal some differences in assessing importance of export problems between small, medium and large firms. Generally, small firms attribute higher importance and influence to all the groups of export barriers in comparison with larger firms (Table 3), which results in higher marks for all four groups of barriers, in comparison with large firms.

Table 3 **Importance of export barriers as assessed by small medium and large firms**

Export barriers	All firms	Small	Medium	Large
1. External barriers	*3.69*	*3.71*	*3.72*	*3.6*
exchange rate policy	3.86	3.97	3.67	3.71
high cost of export financing	3.88	3.95	3.81	3.71
bureaucracy of government agencies	3.72	3.69	3.81	3.71
lack of government support	4.06	4.05	4.1	4.06
strong international competition	3.94	3.86	4	4.12
poor country image	2.70	2.73	2.95	2.29
2. Operational barriers	*3.14*	*3.18*	*3.26*	*2.85*
high transportation cost	3.33	3.17	3.43	3.76
problem of transport organisation	3.02	3.27	2.9	2.29
provision of export documentation	2.95	3	3.19	2.47
problem of payment in foreign operations	3.26	3.27	3.52	2.88
3. Organisational barriers	*2.79*	*2.92*	*2.63*	*2.55*
export department organisation	2.53	2.59	2.53	2.35
deficiency of skilled personnel	3.04	3.19	2.85	2.76
low employee commitment to export	2.79	2.97	2.5	2.53
4. Marketing barriers	*3.25*	*3.25*	*3.47*	*3.02*
adaption of product for foreign markets	3.43	3.42	3.71	3.12
fulfilling quality standards	3.63	3.42	4.05	3.88
problems with providing after sale services	2.91	2.82	3.38	2.65

Export barriers	All firms	Small	Medium	Large
absence of direct contact with foreign consumers	2.85	2.93	2.81	2.59
foreign distributor selection	3.18	3.22	3.32	2.88
lack of foreign market information	3.27	3.47	3	2.88
organisation of foreign market research	3.33	3.35	3.33	3.24
incapacity of promotion in foreign markets	3.14	3.15	3.43	2.76
insufficient innovation	3.21	3.31	3.45	2.59
inability to differentiate offer from competitors	3.18	3.1	3.6	2.94
lack of price competitiveness	3.68	3.55	4.05	3.71

Source: Survey responses and authors calculations.

However, in ranking the most serious obstacles all three groups of firms evaluated external barriers with the highest yet pretty similar marks. Moreover, lack of government support appears as a highly assessed problem which is in the first (small and medium firms) or in second place (large firms, a little behind international competition) but with the similar marks. Also, when ranking the first five obstacles hindering export, the firms of various sizes show some differences but not significant. Nevertheless, some interesting variations appear. Large firms are primarily concerned with competition in foreign markets, they cope with the problems of transportation and storage (which could be a problem related to firm size and scale of exports), and are critical in regard to their price competitiveness, which is not necessarily the case with smaller firms (except for some medium enterprises).

On the other hand, there are some statistically significant differences (marked grey in Table 3) in assessing the importance of problems that small and large firms face in export businesses. Such a case one may encounter in regard to transport organization (t=2.751, p=0.007), which could appear as a consequence of higher competencies, broader possibilities and better organization of transport in larger firms. Far more interesting are the differences in perceiving deficiencies of information about foreign markets (t=1.705, p=0.092) and lagging on innovation (t=1.800, p=0.076). These two problems – lack of export information and insufficient innovation – concern much more seriously smaller firms than larger ones. Quite similar results appear in observing medium and large firms on the subject of innovation. There is a significant difference between medium and large firms (t=1.946, p=0.060) in perceiving lags in innovation practices; medium firms apply the highest importance to the problem of innovations deficiency when compared with both – small and large firms.

This brings us again to the question in what way government actually supports SME and to what extent it assists them in their operations, in inner organization and upgrading their knowledge in conducting business. It seems that government programs are primarily oriented to support establishment of SME, leaving them alone in finding export paths, trying to innovate, etc. Despite some general programs specific policy measures in support of SME operation, export, innovation, clustering etc. are usually neglected. Based on the doubtful though until recently predominant premise of full state withdrawal from economic processes some carelessness regarding innovation policies appear to be counterproductive: as it was repeatedly remarked – totally inactive role of the state may rather obstruct development of the economy than incite remarkable upward moves (Chang, 2011, and Mazzucato, 2011).

In exploring different perceptions of export barriers in regard to export experience of the firms and comparing exporters with non-exporters as well as regular and sporadic exporters we found several interesting results. Firstly and again, external barriers are perceived as the major obstacle, irrespectively whether firms export or not and whether the firms export regularly or from time to time. Furthermore, the lack of government support appears one more time as the most remarkable problem but interestingly, only in cases when firms have some export experience (Table 4). Non-exporters push in front line some other issues that seem mostly like a preconception and an excuse for their non-exporting than as an experienced problem in practice(exchange rate, bureaucracy of government agencies, export financing costs). These issues could be paired with other also highly assessed problems by non-exporters from other groups of barriers like inability to fulfill quality standards, lack of price competitiveness, poor prospects of product adaption for foreign markets etc. – that demonstrate a kind of their fear when facing export activities. Nevertheless and maybe just because of that, these perceptions could be a useful guideline for export supporting policy by giving an indication how and where these firms should be encouraged and where their weak points are.

Apart from these remarkable but still not necessarily significant differences we found some statistically significant distinctions in responses of firms with different export experience (marked by grey color in Table 4). Thus for example, non-exporting firms complaint significantly more for lacking of foreign market information(mark 3.86) than exporting firms usually do (though even they, according to the marks given for importance of that barrier – marks above 3 – seem to be pretty critical concerning information acquired). From the policy standpoint this could be an important input that should motivate policymakers to re-question export relevant information flows and find new channels for their transmissions

and amplification (either through some professional bodies, state agencies or firms associations and particularly through chambers of commerce – institutions that are still searching for their right place in a post-transition economy).

Table 4 **Importance of export barriers as assessed according to export experience: exporters (EX), non-exporters (NX), regular (RX) and sporadic exporters (SX)**

Export barriers	EX	NX	T	p	NX	SX	RX	F	p
1. External barriers	*3.67*	*3.84*			*3.84*	*3.86*	*3.57*		
exchange rate policy	3.77	4.36	1.556	0.123	4.36	3.77	3.78	1.199	0.306
high cost of export financing	3.86	4.00	0.431	0.667	4.00	3.97	3.80	0.304	0.739
bureaucracy of government agencies	3.61	4.36	1.853	0.067	4.36	3.97	3.43	3.206	0.045
lack of government support	4.11	3.79	-1.029	0.306	3.79	4.23	4.04	0.844	0.433
strong international competition	3.96	3.79	-0.502	0.617	3.79	4.17	3.85	0.771	0.465
poor country image	2.70	2.71	0.030	0.976	2.71	3.03	2.52	1.385	0.255
2. Operational barriers	*3.46*	*3.54*			*3.54*	*3.73*	*3.32*		
high transportation cost	3.40	2.86	-1.488	0.140	2.86	3.47	3.37	1.152	0.320
problem of transport organisation	3.05	2.86	-0.495	0.622	2.86	3.76	2.67	7.331	0.001
provision of export documentation	2.87	3.43	1.470	0.145	3.43	3.63	2.50	7.901	0.001
problem of payment in foreign operations	3.26	3.21	-0.116	0.908	3.21	3.27	3.26	0.007	0.993
3. Organisational barriers	*3.30*	*3.46*			*3.46*	*3.58*	*3.16*		
export department organisation	2.43	3.14	1.849	0.068	3.14	2.88	2.20	4.134	0.019
deficiency of skilled personnel	2.98	3.43	1.109	0.270	3.43	3.36	2.78	2.218	0.115
low employee commitment to export	2.77	2.93	0.382	0.703	2.93	2.89	2.70	0.228	0.796
4. Marketing barriers	*3.19*	*3.62*			*3.62*	*3.20*	*3.19*		

Export barriers	EX	NX	T	p	NX	SX	RX	F	p
adaption of product for foreign markets	3.35	3.93	1.484	0.141	3.93	3.33	3.35	1.092	0.340
fulfilling quality standards	3.52	4.29	1.858	0.066	4.29	3.27	3.67	2.503	0.087
problems with providing after sale services	2.79	3.64	2.060	0.042	3.64	2.57	2.91	2.664	0.075
absence of direct contact with foreign consumers	2.83	2.93	0.231	0.818	2.93	2.60	2.96	0.649	0.525
foreign distributor selection	3.12	3.50	0.971	0.334	3.50	3.28	3.04	0.762	0.470
lack of foreign market information	3.17	3.86	1.917	0.058	3.86	3.43	3.02	2.940	0.058
organisation of foreign market research	3.33	3.29	-0.129	0.898	3.29	3.47	3.26	0.260	0.772
incapacity of promotion in foreign markets	3.10	3.43	0.858	0.393	3.43	3.30	2.98	0.911	0.406
insufficient innovation	3.12	3.71	1.422	0.158	3.71	3.14	3.12	1.003	0.371
inability to differentiate offer from competitors	3.17	3.21	0.110	0.913	3.21	3.18	3.17	0.006	0.994
lack of price competitiveness	3.62	4.07	1.211	0.229	4.07	3.63	3.61	0.729	0.485

Source: Survey responses and authors calculations.

Non-exporters find the bureaucracy of government agencies as a very important and even predominant obstacle for export (mark 4.36) and do significantly differ from exporters (t=1.853, p=0.067), although exporters also judge this problem with a relatively high marks (3.61). Still, looking altogether, regular exporters cope definitely better with this problem when compared with non-exporters and sporadic exporters and this makes a significant difference in their attitude (F=3.206, p=0.045).

Non-exporters also show significantly different approach towards their ability to fulfill quality standards (mark 4.29) in comparison with exporters (t=1.858, p=0.066), but also when observed with exporters who export regularly and those who export sporadically (F=2.503, p=0.087). Interestingly, those sporadic exporters are the least worried about their success in getting quality standards (mark

3.27), which is probably in consequence of their position of using occasional chances for export with lesser concern about permanent product adjustment for certain markets and establishing long term relations with foreign buyers.

Finally, we have found some statistically significant differences in barriers assessments between exporters and non-exporters, such as problems of export department organisation (t=1.849, p=0.068) and problems with providing after sale services (t=2.060, p=0.042). That can be understood as the problems of local management and shall be better studied in managerial practice of those firms.

Similarly, we found specific yet significant differences when analyzed firms divided in three groups: non exporters, sporadic exporters and regular exporters. Expectedly, the majority of differences in assessing obstacles for export stay with non-exporting firms but we also found some specific characteristics that concern sporadic exporters: sporadic exporters assess the importance of export barriers at a higher grade than exporters, but also higher than non-exporters do for all types of barriers except for marketing ones.

Also, it is remarkable that in this kind of firms' grouping we encounter some statistically significant differences in assessing the importance of operational barriers, evidently due to the assessments of sporadic exporters. Thus, we find significant differences in evaluating problems with transport organization (F=7.331, p=0.001) and provision of necessary export documentation (F=7.901, p=0.001), that is, with problems that are relatively successfully resolved among regular exporters. Together with high marks for external and organizational barriers, this indicates what issues should be targeted in export supporting policies when new entrants in export activities are in question. For this purpose, some educational programs or online data bases are quite suitable. Moreover, they are neither that expensive nor too complex for execution.

Further on, we shall analyze differences in managers' responses and their attitudes toward export barriers as related to the location of theirs firms. Relying on an obvious fact that the main government institutions that support exports, as well as main financial and marketing organizations are located in the capital city, we tried to find out whether and how much location of the firm could impact perception of export problems. The result revealed some significant differences regarding assessment of external and marketing barriers. Firms located in the capital city perceived external and marketing barriers as less obstructing than did the managers of firms from other locations. Respondents from firms located outside of capital city assessed all external barriers with higher marks indicating their higher importance except for export financing problems that were seen as slightly less serious. Such attitude made the total assessment of external barriers significantly higher for firms located outside capital city. However, it is good to

remark that again we have the lack of government support in the first place of export difficulties as assessed by the both firm groups.

We found similar results regarding marketing barriers. Managers from firms located outside Belgrade – capital city assessed as significantly more obstructing marketing barriers than their colleagues from capital. Although they assessed as more serious all marketing barriers statistical testing shows that they particularly and significantly differ in assessing those marketing obstacles that are connected with their products or more precisely, regarding their firms' ability to adapt products, fulfill necessary quality standards and differentiate their offer from competitors they face plus pointing at the difficulty to find a proper foreign distributor (grey cells in Table 5). We conclude that such assertions indicate that in capital city one may find more marketing knowledge, skills and advisors as well as better information about foreign markets and their actors than firms in other locations can count upon.

Table 5 **Importance of export barriers as assessed according to location of firms: Belgrade (capital city) and other locations**

Export barriers	Belgrade	Other location	T test	Sig. (2-tailed)
1. External barriers	**3,5544**	**3,8406**	**-1,861**	**0,066**
exchange rate policy	3,72	4,00	-1,049	0,297
high cost of export financing	3,90	3,85	0,209	0,835
bureaucracy of government agencies	3,55	3,87	-1,121	0,265
lack of government support	4,00	4,11	-0,481	0,631
strong international competition	3,76	4,17	-1,686	0,095
poor country image	2,48	2,96	-1,734	0,086
2. Operational barriers	**3,1990**	**3,0745**	**0,735**	**0,464**
high transportation cost	3,48	3,19	1,109	0,270
problem of transport organisation	3,20	2,81	1,461	0,147
provision of export documentation	2,90	3,00	-0,367	0,714
problem of payment in foreign operations	3,20	3,30	-0,339	0,735
3. Organisational barriers	**2,6458**	**2,8815**	**-0,911**	**0,365**
export department organisation	2,38	2,67	-1,037	0,303
deficiency of skilled personnel	2,81	3,26	-1,533	0,129
low employee commitment to export	2,75	2,79	-,126	0,900
4. Marketing barriers	**3,0758**	**3,4959**	**-2,291**	**0,024**

Export barriers	Belgrade	Other location	T test	Sig. (2-tailed)
adaption of product for foreign markets	3,16	3,72	-2,048	0,043
fulfilling quality standards	3,36	3,91	-1,915	0,058
problems with providing after sale services	2,86	2,94	-0,254	0,800
absence of direct contact with foreign consumers	2,84	2,87	-0,111	0,912
foreign distributor selection	2,90	3,48	-2,129	0,036
lack of foreign market information	3,16	3,40	-0,950	0,344
organisation of foreign market research	3,12	3,53	-1,598	0,113
incapacity of promotion in foreign markets	3,04	3,28	-0,860	0,392
insufficient innovation	3,06	3,36	-0,984	0,328
inability to differentiate offer from competitors	2,90	3,50	-2,277	0,025
lack of price competitiveness	3,46	3,91	-1,736	0,086

Source: Survey responses and authors calculations.

Finally, we analyzed the responses obtained in regard to the main exporting destination of the firms in the sample. At the first site the results seem somewhat astonishing. Thus, for example it is remarkable that the firms that export to former Soviet Union (SU) markets perceive export barriers systematically to be much lesser than do the firms exporting to the EU and former Yugoslav (YU) market. Such a result is found in all groups of barriers and is even statistically significant for external and organizational barriers (Table 6). It is particularly remarkable that firms exporting to ex-SU markets assess the problems of insufficient government support (mark 3.56) or bureaucracy of government agencies (2.44) with the lowest marks among all exporters. They are also less worried about provision of necessary documentation for exports (2.06). Additionally, they also do not highly assess the problem of foreign distributor selection (2.50). All these differences are statistically significant.

On the other hand, though statistically insignificant, some differences remain notable putting again in a different position exporters to former SU compared with their counterparts that export to other markets. These differences are connected with the fears of exporters to ex-SU in regard to their competitive position in the market; namely, managers of these firms attribute higher importance than the others to the issues like price competitiveness, fulfillment of quality standards, adjusting products to the requirements of the market and to international competition they face. Additionally, they put to this list problems of costs of export

financing. We may only guess why they see their export activities and their position in that way but it can be connected with a frequent practice of finding partners in export market according to their former business links or recommendation of compatriots working there or even according to sometimes specific ways of assuring cooperation that is not founded on the real quality of their products..

Table 6 **Importance of export barriers as assessed according to principal export market: Former Yugoslav republics (ExYU), EU market (without Slovenia and Croatia), Former Soviet Union (ExSU)**

Export barriers	ExYU countries	EU countries	ExSU countries	F	Sig.
1. External barriers	**3.76**	**3.72**	**3.3**	2.407	0.097
exchange rate policy	3.82	3.83	3.44	0.547	0.581
high cost of export financing	3.76	3.63	4.28	1.754	0.180
bureaucracy of government agencies	3.85	3.97	2.44	8.514	0.000
lack of government support	4.26	4.23	3.56	2.902	0.061
strong international competition	3.85	3.97	4.06	0.172	0.843
poor country image	2.88	2.80	2.00	2.887	0.062
2. Operational barriers	**3.19**	**3.19**	**2.88**	0.995	0.374
high transportation cost	3.24	3.50	3.50	0.405	0.669
problem of transport organisation	3.03	3.33	2.50	2.057	0.135
provision of export documentation	3.18	2.93	2.06	4.419	0.015
problem of payment in foreign operations	3.29	3.00	3.44	0.623	0.539
3. Organisational barriers	**2.66**	**3.01**	**2.09**	3.179	0.047
export department organisation	2.39	2.76	1.72	3.437	0.037
deficiency of skilled personnel	3.03	3.03	2.56	0.771	0.466
low employee commitment to export	2.67	3.24	2.00	4.606	0.013
4. Marketing barriers	**3.16**	**3.25**	**3.11**	0.136	0.873
adaption of product for foreign markets	3.03	3.43	3.67	1.319	0.273
fulfilling quality standards	3.35	3.40	3.94	1.019	0.366
problems with providing after sale services	2.65	2.93	2.67	0.360	0.699
absence of direct contact with foreign consumers	2.74	2.83	2.78	0.038	0.962

Export barriers	ExYU countries	EU countries	ExSU countries	F	Sig.
foreign distributor selection	3.36	3.10	2.50	2.385	0.099
lack of foreign market information	3.26	3.23	2.78	1.010	0.369
organisation of foreign market research	3.26	3.53	2.94	1.138	0.326
incapacity of promotion in foreign markets	3.21	3.10	2.72	0.768	0.468
insufficient innovation	2.76	3.48	3.11	1.809	0.171
inability to differentiate offer from competitors	3.24	3.07	3.00	0.235	0.791
lack of price competitiveness	3.47	3.43	4.06	1.523	0.224

Source: Survey responses and authors calculations.

Previous differences become even more visible if we compare results from the perspective of the European countries(EC) as export destination and former SU. This can be seen particularly regarding external barriers (bureaucracy of government agencies – exporters to the EC 3.92; exporters to ex SU 2.35; t= 4.413, p=0.000; lack of government support – EC 4.21, ExSU 3.65; t= 1.919, p=0.058 and poor country image – EC 2.83, ExSU 2.06; t= 2.1, p=0.035), organizational barriers (EC 2.85, ExSU 2.06; ; t= 2.374, p=0.020) and some marketing barriers where we find significant differences in the area of distributor selection, which we have already discussed and in the area of deficiency of foreign market information, which is more problematic for exporters to the EC (3.27, toward 2.71 for ExSU; t=1.694, p=0.094).

5   Conclusions and recommendations

After the overview of responses obtained from the survey and some specific differences among firms in perceiving obstacles for export businesses it is essential to rethink ongoing policies and propose some additional set of measures that could foster export and replace or supplement some of the policies in use. Basically, the survey points at several critical points that are of general significance for all firms in our sample despite some differences in assessing their importance.

Firstly, it is evident that the firms put in the front place external barriers and among them, very often, they underline the lack of government support. It is quite possible that firms and their managers sometimes could over-blame government for their own failures and ineffectiveness but it is still evident that feeling of

an insufficient assist is broadly present despite government claims about export as a priority goal. This can indicate that export supporting measures are not calibrated in an appropriate manner and scale.

Consequently, a question rises – what could be upgraded and in what way? The analysis of firms' responses suggests several points for improvements. In the first place and in regard to external obstacles from firms' standpoint, government should be more concerned about exchange rate policy, costs of export financing and broadly emphasized bureaucracy of state agencies. Secondly, by the right incentives, government policies could contribute more in resolving some of the internal difficulties that firms meet. Directly or through agencies and/or chambers of commerce – if properly defined in the system, a considerable assist could be given concerning information about foreign markets, overpassing low firms' capability to innovate if acting alone, which in turn affects several other issues like inability to adapt and differentiate product supply and compete successfully in foreign markets.

However, relatively high assessments given by firms' managers for importance of internal barriers indicate a certain degree of realism, self-criticism and/ or self-estimation that point at inadequate competencies for export activities. The problems related to product quality, price competitiveness, difficulties in marketing research, finding partners etc. reveal noticeable lagging behind foreign competitors in marketing practices. Also it reveals firms' inability to develop even basic competitive strategies and an evident absence of marketing orientation: it seems that firms rather use transactional approach instead of establishing relations with foreign partners. However, all these critical remarks together with highlighted organizational barriers like poor state of export departments and poor skills or commitment of personnel show a good amount of firm readiness to improve the present state. This attitude opens a field for launching of government programs in professional education of employees but also for more engagement in modernizing the general education system of all grades of schooling.

The main characteristics of Serbian exports as well as differences in perception of barriers between various types of firms studied above request for some necessary renewal of export supporting programs. We firstly point at a relatively low technological level of Serbian exports and even some tendency of its further deterioration over time that we have demonstrated in section two of this paper. This can be largely attributed to the dominant (and in fact unique) subsidizing policy of government concerning FDI. The basic subsidies are expressed in a relatively huge premium for each planned (not even really activated) job by foreign investor. Under this provision Serbia became the most attractive for investors from labor intensive industries (usually demanding low skilled workers) since government subsidies could

tremendously cut labor costs in the first years of operations[33]. Apart from that, according to other studies (e.g. Gunther, 2005; Gorodnichenko, 2007; see also Iwasaki & Tokunaga, 2016) one can hardly find FDI spillover effects of new technologies in transition economies and in Serbian economy can rarely meet R&D offices in the companies owned by foreigners (Cerovic et al. 2015). These facts undoubtedly urge for a major change in government subsidizing principles and a rapid switch towards more active and diversified industrial policies able to attract higher tech industries to install their capacities and operate in the local economy.

The second issue we want to underline concerns government policies towards SME. As explained above, government policy is based on subsidies and other easing conditions for establishing of SME and assisting at the beginning of their business activity. However, the analysis of SME perception regarding export obstacles suggests a strong need for more active supporting policies concerning exports. As already remarked, some significant differences between larger firms and SME appear, particularly on availability of necessary information about foreign markets and firm's innovation capabilities. If SMEs operate outside main economic and administrative center that is, outside capital city – the problems are exacerbated and affect quality level of products which they produce and try to sell abroad. Founded on these facts it looks quite clear that industrial policy should be extended to some other measures for business enhancement than just supportive measures for starting point of SME operations. We primarily suggest formation of various networks and professional associations of firms together with government agencies as a kind of service, advice and informative centers about foreign markets and actual moves and changes in trade. Also, there should be a much stronger and persistent policy of innovation support either through inclusion of SME into various innovation programs and/or research projects or by facilitating use of the results that could be used for innovative purposes within the firm. Finally, these policies should stimulate clustering of SME and target cooperation between SME and larger firms making small businesses unquestionable components of broader undertakings. This approach also requires a more active policy towards foreign investors in terms of supporting their cooperation with local firms as component producers for their export production, substituting in that way the missing spontaneous spillover effects.

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[33] he subsidies amount from several thousand euros to more than 10.000, which practically mean that wages – usually very low i.e. around 200 euros – turn out to be covered for several years in advance. Frequently, this kind of subsidies is followed by free use of land and other benefits. Government officials often claim with no hesitation that are ready to offer at least 5% better conditions than investors could get in any other country entering perhaps into a dubious practice of dumping and unfair competing.

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SUSTAINABLE DEVELOPMENT OF THE RURAL AREAS IN POLAND IN THE ASPECT OF ENVIRONMENTAL ORDER

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Abstract

The aim of the elaboration is to evaluate the level, changes and spatial diversity of selected parameters of the environmental order in the context of realization of conception of sustainable development in the rural areas of Poland in the cross-section of voivodships in years 2005-2015. The research proceedings consisted of three stages. In the first stage, based on the literature, the indicators describing the thematic areas of the environmental order were reviewed. The second stage embraced the analysis of the level and changes and spatial diversity of the selected five components of the environmental order. The last, third stage was based on creating synthetic measurer of the development's level of the environmental order and on showing the spatial diversity in this range in the cross-section of the voivodships. The results of the conducted research indicated substantial spatial diversity, both in case of particular elements creating environmental order in the rural areas of Poland and the phenomena as a whole.

Keywords: *environmental domain, Poland, rural area, sustainable development*

JEL classification: *Q01, Q56, O18*

1 Introduction

1.1 Sustainable development of the rural areas

The supporters of the idea of sustainable development primarily emphasize the fact that people should be responsible for what is happening to the Earth and also for the condition in which our planet will be passed to the next generations. They

consider the governments of the countries and the local authorities should be interested in implementing suitable legislation protecting both the natural environment from the robbery activities of the goods' producers and aiming primarily increasing their benefits (Iova, Cretu, Lascar, 2017, Wierzbicka, 2016).

Sustainable development of the country recognized as a Constitutional Principle of Republic of Poland (Constitution of the Republic of Poland, 1997), in Environmental Protection Law from 2001 is defined as 'social-economic development in which in order to balance the chances of access to the environment of particular societies or their citizens – both the current and the future generations – the process of integration of the political, economic and social activities takes place, maintaining the environmental balance and the durability of the basic environmental processes (Ustawa prawo ochrony środowiska, 2001, Mikula, 2017). The Ecological Policy, a document adopted by Polish country, also took a stand in the matter of sustainable development and it expressed the will the government's policy was compatible with the assumptions of ecological policy in all of the economy branches and the ecological criteria received equivalent rank with economic criteria (Dalecka, Michalska, 2015, Wierzbicka, 2016).

The conception of sustainable development takes on special significance in reference to the rural areas which in Poland constitute over 93% of the country's area (Dolata, 2015,). The domination of the rural areas causes accumulation of various public goods which are socially, economically and environmentally valuable (Woś, Zegar, 2002, p.48). It decides about their huge meaning for the life's quality because they fulfill the basic environmental function for the whole society (Iagaru, Iagaru, 2017).

Moreover, the idea of sustainable development, taking into consideration the prior meanings of the natural environment with realization of the strategic development aims, is especially relevant in the forms of activities whose results depend on the environment. The conception of sustainable development of the rural areas embraces the activities whose aim is to improve the conditions of running a business and the conditions of living in the rural areas, simultaneously not violating specific resources of a village, including the qualities of the natural environment, the country landscape, traditions and the cultural heritage.

According to the conception of sustainable development the environmental order is strictly connected with the definition of natural capital and with the principle of its' durability. Maintaining of that order will allow to keep the owned environmental heritage intact and to pass it to the future generation as a capital which will provide them conditions ensuring the quality of life (Dudek, Wrzochalska, 2017).

To summarize the reflections on the conception of sustainable development in reference to the rural areas, it should be noticed that their realization encounter various social obstacles (low level of the citizens' affluence), intellectual obstructions (low level of the ecological awareness of the citizens) and the ethic impediments (tolerating improper behaviors). Those difficulties also result from the fact that it is a conception trying to reconcile often contradictory aims, especially in a short period of time (Żmija, 2014).

1.2 Measurers of sustainable development in the rural areas

Development and evolution of the conception of sustainable development caused increased interest in indicators of its' measurement. In the literature there are propositions of quantification of sustainable development, both in the spatial layout on various territorial levels (global, country, regional, sub-regional and local), and in the time layout. The indicators of sustainable development are a type of data-diagnostic tools and as the measurers of the calculable effects of implementing idea of sustainable development are used for operationalization its' conception for the needs of controlling the realization of the goals saved in the strategic documents of a given territorial units (Borys, 2005, p. 14, Stanny, 2013, p. 65).

The research on construction of measurements of the sustainable development in Poland were initiated in the 90s of XX century (Borys, Fiedor, 2008). However, in the first decade of XXI century the works on developing homogeneous indicators of measuring of sustainable development on various levels of territorial division of the country (NUTS) were started. Their crowning was elaboration of a number of indicators grouped in accordance with the principle of integrated order, in the range of public statistics (Local Data Bank, 2018, Stanny, Czarnecki, 2011, pp. 26-27).

Nowadays the indicators of sustainable development are divided according to four orders: social, economic, environmental and institutional-political. Each of the orders embraces areas to which suitable indicators are ascribed. (Local Data Bank, 2018). It is compatible with the conception elaborated by EU according to which the set of indicators of sustainable development consists of ten thematic areas (from the economic, through social and environmental, ending with institutional and global partnership dimension). Those areas are divided into sub-subjects which allow to present the operational goals and activities of Strategy of Sustainable Development. The actual set contains over 130 indicators, 10 of which were considered the primary ones (Sustainable development in the European Union, 2015).

Measurement of the effects of implementing the conception of sustainable development of the rural areas, due to considerable difficulties, demands using

suitable system of indicators and measures. It results from the fact that in the public statistics on the level of aggregation which are the rural areas there is no statistical data necessary to construct various indicators of environmental order.

2   Data and Methods

Realization of the adopted in the present elaboration aim demanded multidimensional approach. Thus, beside short reflections embracing theoretical issues connected with sustainable development mentioned above, the analysis of the values of selected indicators describing the environmental order was performed, using selected statistical methods. The basic data source was the internet analysis shared by the Central Statistical Office – Local Data bank. The spatial range of the research embraced rural areas of Poland in the cross-section of voivodships, whereas the time range were the years 2005-2016.

For the purpose of the present elaboration, in order to show the level of environmental order and its' spatial diversity, the indicators from so called long list of indicators of sustainable development were chosen, more specifically from the part of the list concerning the environmental dimension with elements of spatial order.

Guided by the essential and statistical reasons, five indicators (diagnostic features) of the environmental order of sustainable development of the rural areas were chosen for the research purposes:
- percentage of the forests in general area of the rural areas in % (woodiness),
- mixed waste in kg/person (waste),
- percentage of population using wastewater treatment plants in general population in % (wastewater treatment),
- percentage of population using water supply network in general population in % (waterworks),
- percentage of population using sewage network in general population in % (sewerage).

The first stage of the empirical research embraced the analysis of the changes, level of development and spatial diversity of the selected components of the environmental order in the rural areas both throughout the country and in particular voivodships. The following stage was based on showing the level of development and spatial diversity of the environmental order as a complex phenomenon. In order to do that, a measurer used in the issue of subordination of multi-feature object was used, meaning a synthetic measurer of the level of development. The designated values of the measurer allowed to organize the voivodships according

to their level of development into the chosen elements of environmental order. The measurer was also used in order to divide all of the researched voivodships into four typological groups focusing the voivodships with similar level of environmental order. The isolation of the groups was done using a method based on analysis of differences between the level of value of the measurer calculated for the neighboring voivodships, ordered according to decreasing value of that measurer.

3   Results and Discussion

A relevant component in evaluation of the level of sustainable development in the context of environmental order is the water supply system. In the analyzed in the elaboration period the length of distribution of water supply network in the rural areas increased by 42,5 thousand of km, meaning by 22,2%. In each of the research years the lengths of networks increased on average by 1,5%. In 2016 for each 100 km^2 of rural area there was 80,2 km of waterworks, and in 2005 the analogical amount was smaller by 14,7 km. Increase of the length of the waterworks network was accompanied by increase in the number of its' connection to the residential buildings and by rise of share of the receivers of water supplied in that way in the general population of the country. Within 12 years the number of water connections to the residential buildings increased by 695 522 pcs., that is by 25,3%. In 2005 the 72,2% of citizens of Polish country had the possibility of water intake from the water supply network, and in 2016 that percentage shaped at the level higher by 12,8 pp. (Figure 1). The annual average rate of changes in share of people using water supply network in the general population was 1,8%. Along with the development of water supply network the water usage in the rural areas increased. When in 2005 one person was allocated 23,6 m^3 of water,in 2016 it was more by 5,6 m^3.

Figure 1 **Population using the water supply network, sewage network and water treatment plant in % of general population living in the rural areas of Poland in years 2005-2016**

Source: Calculations and the author's study based on Local Data Bank CSO, 2018.

The water supply network was one of the least diversified elements of the water-sewage infrastructure in the rural areas. In 2016 the highest level of percentage of rural areas' population using water supply network characterized Opolskie voivodship (95,1%) and Wielkopolskie voivodship (94,7%), whereas the lowest characterized Małopolskie voivodship (68,4%). During the twelve researched years its' highest increase took place in Mazowieckie voivodship (by 19,7 pp.), and the lowest increase took place in Opolskie voivodship (by 4,2 pp.). Furthermore, the greatest density of the water supply networks characterized Śląskie voivodship (118,5 km/100 km^2), when the smallest density characterized Lubuskie voivodship (35,4 km/100 km^2). The greatest progress in development of network was noticed in Mazowieckie voivodship (by 27 km,100 km^2), whereas the least progress was noticed in Lubuskie i Opolskie voivodships – accordingly – 6,2 and 6,5 km/100 km^2).

The average annual rate of changes of selected indicators of environmental order of sustainable development of rural areas for the country and particular voivodships was presented in Table 1.

Table 1 **Average annual rate of changes of the selected indicators of environ-
mental order of sustainable development of rural areas in Poland in
years 2005-2016**

Voivodship	Woodi-ness	Waste	Waterworks		Sewerage		Waste-water treatment
			using	length	using	length	
Polska	0,23	4,5	1,8	1,5	7,1	8,5	6,6
Dolnośląskie	0,20	2,6	1,9	1,3	6,8	7,6	6,7
Kujawsko-pomorskie	0,12	6,8	1,4	1,4	4,8	5,9	4,2
Lubelskie	0,36	3,0	1,8	1,8	7,1	9,1	5,6
Lubuskie	0,09	3,3	1,6	1,6	8,5	11,1	8,4
Łódzkie	0,29	3,6	0,9	1,4	8,0	9,7	8,8
Małopolskie	0,08	5,7	2,3	2,2	8,4	9,7	7,9
Mazowieckie	0,49	4,9	2,7	2,5	8,8	11,5	8,1
Opolskie	0,06	2,3	0,9	0,4	10,6	12,0	10,5
Podkarpackie	0,40	2,9	1,1	1,3	6,5	6,1	5,9
Podlaskie	0,26	2,9	1,8	1,0	3,6	6,8	3,7
Pomorskie	0,14	4,5	2,5	1,2	5,7	8,7	5,1
Śląskie	0,05	3,9	1,4	1,0	7,8	9,2	7,4
Świętokrzyskie	0,22	2,5	1,8	1,9	9,9	10,5	9,2
Warmińsko-mazurskie	0,40	5,8	2,8	1,7	6,0	8,0	5,1
Wielkopolskie	0,10	5,7	1,2	0,9	6,8	8,1	6,5
Zachodniopomorskie	0,21	6,2	3,2	0,9	4,3	8,3	3,8

Source: Calculations and the author's study based on Local Data Bank CSO, 2018.

For the sustainable development, next to effective water usage, protection from pollution whose source is primarily waste, is also significant. Therefore, while shaping environmental order, a drainage and water treatment system is extremely important.

In years 2005-2016 in the rural areas of Poland, compared to the development of water supply network, much higher increase in developing sewage network took place. Average annual rate of changes of length of distribution of sewage network increased by 8,5%, which expressed in absolute numbers gave almost two and half times increase of that length (from 36,8 thousand km in 2005 to 90,5 thousand km in 2016). The density of network also increased, from 12,7 km

per 100 km^2 to 31,1 km/ km^2. As a result of such fast increase in the length of sewage network, the number of its' connections to the residential buildings also raised – from 598 thousand in 2005 to 1 462 thousand in 2016, that is almost two and half times increase. Large revival of investment processes in the sewage drainage network found its' reflection not only in the increase in the length of the network and the number of its' connection to the residential buildings, but also in systematic, progressing each year increase in population using its' services. When in 2005 percentage of population of Polish country serviced by sewage network was 19% of the general number of people living there, in 2016 its' value shaped at the level higher by 21,3 pp. (Figure 1).In each of the researched years the share of population using the sewage network in the general population increased on average by 7,1%.

The development of the sewage network in the rural areas of Poland in the cross-section of voivodships was characterized by considerable diversity, taking into consideration both the availability and the density. The analysis of the spatial diversity of possibility to use the sewage network in the last year of research indicates that the voivodship in which it was relatively large was Pomorskie voivodship (61,5% of country citizens), whereas it was relatively low in Lubelskie (21,1%) and Podlaskie (21,8%) voivodships. In turn, the greatest density of sewage network occurred in Podkarpackie voivodship (76,0/100 km^2) and in Małopolskie voivodship (76,3 km/100 km^2) and the smallest one occurred in Podlaskie voivodship (8,9/100 km^2). In years 2005-2016 the largest development in the range of increasing the availability to sewage network services was noticed in Podkarpackie voivodship (by 35,2 pp.), whereas in the range of increasing density – in Małopolskie voivodship (by 48,8 km/100 km^2). The least favorable changes characterized voivodship with relatively high level of availability, that is Pomorskie voivodship (by 7,9 pp.) and the voivodship with the lowest network density, which is Podlaskie voivodship (by 4,6 km/100 km^2).

Water treatment plants, next to the water supply network and the sewage network, are the indispensable elements of water protection and the sanitary protection of population. In years 2005-2016 in the rural areas of Poland 497 water treatment plants were built (in 2016 there was 2 506 of them). Along with the increase in the number of water treatment plants, a systematic increase of population using their services occurred, from 22,0% in 2005 to 41,3% in 2016 (Figure 1). The average annual rate of changes of rural population share using the services of collective water treatment plants in general number of citizens was 6,6%.

The spatial distribution of the indicator describing percentage of population using water treatment plants in the rural areas of Poland suggests that in 2016 its' highest level, as in the case of sewage network, was noticed in Pomorskie

voivodship (62,1%), whereas the voivodship in which within twelve years the highest increase in the population serviced by water treatment plants was observed was the Opolskie voivodship (by 34,1 pp.). The greatest neglect in this area characterized the country of Podlaskie voivodship which is indicated by both relatively low level of percentage describing share of population using collective water treatment plants in general number of citizens (22,8%) and a small change (by 6,5 pp.).

Increasing the share of forests' area in general Poland's area is one of the priorities of the forest policy run by the country. The woodiness indicator allows to monitor the realization of the first of aims of the Strategy for Energy Security and the Environment which is balanced management of the natural resources, where reaching the woodiness at the level of 30% in Poland in 2020 is assumed (Kierunki rozwoju obszarów wiejskich – założenia do Strategii zrównoważonego rozwoju wsi i rolnictwa 2010).

The analysis of the woodiness indicator of the rural areas of Poland suggested a positive and expected direction of changes, wherein the rate of those changes in the analyzed years was relatively slow. In 2016, compared to 2005, the value of woodiness indicator describing the rural areas in the whole country increased by 0,79 pp. The greatest level of woodiness characterized the area of Lubuskie voivodship (50,4%), whereas in the other end of the ranking there was Łódzkie voivodship (22,1%). In the analyzed period in the elaboration in all of the voivodships there was an increase of share of wooded areas in the general area. The highest growth of woodiness took place in Podkarpackie voivodship (by 1,7 pp.), whereas the lowest – in Wielkopolskie voivodship (by 0,3 pp.).

A significant component in evaluation of level of sustainable development in the context of environmental order is the municipal waste. The amount of waste collected throughout the year successively increases and it is a negative phenomenon, however, it is simultaneously inevitable according to increasing consumption.

In 2016 in the rural areas 2 326 thousand of tones of mixed waste were collected, which constituted 68% more than twelve years earlier. In 2005 the amount of collected waste per capita was 95kg and it increased to the level of 152,1 kg/person in 2016. Each year the value of this indicator increased on average by 4,5%.

It is worth noticing that spatial diversity of the phenomenon is relatively large (the coefficient of variation in 2016 shaped at the level of 32,9%). The largest amount of waste per capita fell in the Zachodniopomorskie voivodship (241,2 kg/person.) and also in this voivodship the highest increase of the indicator took place in the researched period (by 116,8 kg/person.). On the opposite pole there

was Świętokrzyskie voivodship where in 2016 70,8 kg of mixed waste fell per capita, that is more than in the first year of the research.

Table 2 **Selected indicators of environmental order of sustainable development of the rural areas in Poland in the cross-section of voivodships in 2005 and 2016.**

Voivodship	Woodiness		Waste		Wastewater treatment		Waterworks		Sewerage	
	2005	2016	2005	2016	2006	2016	2005	2016	2005	2016
Polska	29,4	30,1	94,0	152,1	22,0	41,3	72,2	85	19,0	40,3
Dolnośląskie	29,5	30,1	159,0	211,6	24,1	45,8	77,2	88,8	21,5	44,2
Kujawsko-pomorskie	23,5	23,8	78,8	163,1	25,8	37,8	80,0	93,1	22,9	38,4
Lubelskie	22,9	23,8	58,7	81,5	15,1	24,8	66,1	80,3	9,9	21,1
Lubuskie	49,9	50,4	163,6	233,1	19,3	42,9	75,4	89,5	16,7	40,8
Łódzkie	21,4	22,1	91,1	133,8	11,2	25,5	79,0	92,5	10,7	24,9
Małopolskie	29,0	29,3	73,6	136,0	18,6	39,0	53,7	68,4	15,8	38,5
Mazowieckie	22,5	23,7	82,9	140,7	14,3	30,0	63,7	83,4	11,6	29,2
Opolskie	26,8	27,0	148,5	191,5	20,6	54,7	90,9	95,1	17,3	52,5
Podkarpackie	37,7	39,4	70,2	96,4	32,4	57,1	62,2	71,5	28,1	55,9
Podlaskie	30,6	31,4	82,2	112,6	16,3	22,8	72,3	81,1	14,7	21,8
Pomorskie	36,5	37,1	118,0	191,6	37,9	62,1	80,3	91,7	33,3	61,5
Śląskie	33,4	33,6	102,6	156,9	23,2	46,2	78,4	87,8	20,3	46,6
Świętokrzyskie	28,0	28,6	53,9	70,8	15,2	37,2	71,0	87,2	12,6	35,7
Warmińsko-mazurskie	30,4	31,8	92,5	172,1	27,5	46,5	73,7	88,8	22,9	43,5
Wielkopolskie	26,1	26,4	111,8	204,9	25,2	46,4	85,8	94,7	22,6	46,6
Zachodniopo-morskie	36,0	36,9	124,5	241,2	39,4	57,1	84,4	93,2	36,0	57,4

Source: Calculations and the author's study based on Local Data Bank CSO, 2018.

While analyzing the development of particular elements of the environmental order, it is hard to talk about the level of its' development as a whole in each voivodship. Thus, in the following stage of research in order to determine the condition of development of the environmental order as a whole in particular voivodships a synthetic measurer of level of development of the environmental

order was calculated for each voivodship. On the basis of the made calculations, four typological classes were determined.

In order to present the diversity of environmental order in the rural areas in Poland more clearly, the results of performed classifying procedure were presented on a map (Figure 2).

Four voivodships were classified to the first class, characterized by high level of environmental order: Zachodniopomorskie, Podkarpackie, Pomorskie and Opolskie voivodships. The average values of the indicators in this class characterizing the level of environmental order suggest primarily high level of equipment in the range of availability of the rural population to the services of water treatment plants (58,1% of general population) and the sewage network (57,1% of the general population) and large share of the forests in general area (36,3%).

The second typological class consists of the voivodships whose rural areas are characterized by medium level of environmental order. This class contains five voivodships: Wielkopolskie, Śląskie, Dolnośląskie, Warmińsko-Mazurskie and Lubuskie voivodships. Those areas are characterized by large share of population in using the water supply network (90,7% of general population) and relatively high value of indicator describing the amount of produced mixed waste (90,7 kg per person). In case of the indicators describing other parameters of environmental order in the second class, which are woodiness, sewage network and water treatment plants, their values shaped on the slightly higher level than the values for the rural areas of the whole country.

Delimitation of the rural areas of Poland taking into consideration the level of sustainable development in environmental order's dimension in 2016 (in the cross-section of voivodships)

Source: Calculations and the author's study.

The smallest, third class embraced three voivodships with low level of environmental order: Małopolskie, Kujawsko-Pomorskie and Świętokrzyskie voivodships. The lacks in this class primarily concern disseminating services of water supply network (78,7% of general population). However, what draws attention is far lower amount of produced waste, compared to the first and second class and the average value for the whole country (129,2 kg/person).

The fourth class, to which voivodships characterized by low level of environmental order were assigned, consists of the following voivodships: Mazowieckie, Podlaskie, Łódzkie and Lubelskie. The average values in this class indicate very low condition of the environmental order in the range of woodiness, water treatment, sewage network and none of the values describing those factors does not exceed the average values calculated for the rural areas of Poland. The feature which distinguishes this group is the fact that the average amount of waste per one rural resident is lower than in other classes and in the whole country.

4   Conclusions

The analysis of data received during the research concerning environmental order of sustainable development of rural areas in Poland in the cross-section of

voivodships, presented in the elaboration, allows to formulate the following conclusions:

- In years 2005-2016 in the rural areas of the whole Poland and in particular voivodships the changes favorable to implementing the conception of sustainable development in its' environmental aspect took place. The development of equipment of rural areas in the range of water-sewage infrastructure occurred and the woodiness indicator increased, however, it happened at different pace in various areas. However, the only unfavorable change was the increase in production of waste.

- The phenomenon which is absolutely positive in the context of environment protection is the fact that throughout the researched years the shares of rural population using services of the water treatment plants and sewage networks shaped on a similar level.

- Still, significant disproportions between the level of availability to the services of water supply network and the level of availability to the services of water drainage and treatment systems constitute a huge problem. Despite the dynamic development of sewage network and water treatment plants, they are not used even by half of the Polish rural residents.

- In the end of 2016 statistical view of diversity (expressed by the coefficient of variation) of analyzed elements of environmental order in the rural areas of particular voivodships indicated that the largest diversity characterized the amount of mixed waste per capita (32,9%), whereas the lowest diversity – percentage of the availability of the rural residents to the water supply network (9,1%).

- The analysis of spatial distribution of the rural areas in the cross-section of the voivodships, according to their affiliation to the separated typological classes focusing units with similar level of environmental order, allows to notice that the high and medium level of environmental order characterized mainly the voivodships of the northern, western and southern part of the country. On the other hand, the classes focusing the voivodships with low and very low level of environmental order were placed in the central and eastern part of Poland.

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NUTRITIONALLY RECOMMENDED FOOD PRODUCTS DEMAND

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Abstract

The aim of this paper is to find out how the demand determinants influence the demand of selected food products in Slovak Republic. For demand determinants, in line with economic theory, we considered the own price of food product, the prices of other food products and the net income of the consumer. For the analysis were selected milk and diary products. The analysis was conducted in period 1998-2016. The regression analysis was applied to estimation of the functions of demand. From them, price and income elasticities of the demand were calculated. In tracking period decreased the milk and dairy products consumption in the Slovak republic very hard. According to the income elasticities of the demand the liquid drinking milk seems to be an inferior good for an average Slovak consumer. An increase in income can more likely lead to an increase in demand for curd, fermented milk products and cheese. According to own price elasticities of demand, demand for milk and milk products didn't react elastically to the change of price. It is necessary to use also other policies, except of government price tools policies, to increase consumption of milk and dairy products.

Keywords: *demand, elasticity, food products, nutritional recommendations*

JEL classification: *D03*

1   Introduction

The structure of food consumption in Slovak republic seems to be unbalanced from a long-term perspective. On the one hand, consumers aren't receiving enough nutrition from the food, on the other side, energy intake is increasing.

Especially consumption of fruits, vegetables, milk and milk products is low. Long-term high is the consumption of pork, eggs, carbohydrates, fats, oils and salt. Increasing interest in health and well-being is likely to drive a growth in demand for products that have positive effects on health, *Puhakka et al (2018)*. Many domestic and foreign scientists are oriented to the development of food demand and its determinants. There is renewed interest in robust estimates of food demand elasticities at a disaggregated level not only to analyse the impact of changing food preferences on the agricultural sector, but also to establish the likely impact of pricing incentives on households, *Ulubasoglu et al (2016)*. The conventional view is that inelastic demand makes consumption of staple foods resilient to major price and income shocks. While demand for foodstuffs may remain relatively unchanging in environments characterised by stable food prices and incomes, economic crises and significant price spikes appeared to induce dramatic changes in price and income demand elasticities. *Dimova et al (2014)*.

2   Data and Methods

The aim of this paper is to find out how the demand determinants influence the demand of selected food products in Slovak Republic. For demand determinants, in line with economic theory, we considered the own price of food product, the prices of other food products and the net income of the consumer. For the analysis were selected milk and diary products. The consumption of them is insufficient and it is continually decreasing.

The analysis was conducted in period 1998-2016. Data source was Slovstat (The Statistical office of the Slovak Republic). The regression analysis is applied to estimation of the functions of demand.

The demand for chosen food product x_i is the function of the price of the food product (p_{xi}), of the price of other food products (p_{yj}), and of net income of consumers (I).

$$q_{dx} = f\left(p_x, p_y, I\right) \text{ (1)}$$

The general linear model

$$y = a + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 \text{ (2)}$$

The linear model of demand has the following form:

$$q_{dxi} = a + b_1 p_{xi} + b_2 p_{y1} + b_3 p_{y2} + b_4 p_{y3} + b_5 I_5 \text{ (3)}$$

where: q_{dxi} – demand for the food product *xi* in the kilograms and habitants per year

a, b_k – estimated constant of location and regression coefficients $k = 1,5$

p_{xi} – purchase price of the x-th food product (i=1,4) in EUR *kg^{-1}
p_{yj} – purchase price of the y-th food product (j=1,3) in EUR *kg^{-1}
I – average income of habitants in EUR *year^{-1}

The general power model

$$y = a * x_1^{\beta 1} * x_2^{\beta 2} * x_3^{\beta 3} * x_4^{\beta 4} * x_5^{\beta 5} \text{ (4)}$$

The power model of demand has the following form:

$$q_{dxi} = a * p_{xi}^{b1} * p_{y1}^{b2} * p_{y2}^{b3} * p_{y3}^{b4} * I^{b5} \text{ (5)}$$

where:

ditto (3)

For the quantification of sensitivity of demand are estimated the own price elasticities, cross price elasticities and income elasticities of demand.

Own price elasticity of demand

$$Epdx = \frac{\%\Delta Qdx}{\%\Delta Px} \text{ (6)}$$

where:

$Epdx$ – own price elasticity of demand in percents
$\%\Delta Qdx$ -percentual change in quantity of demand of x-th food product
$\%\Delta Px$-percentual change in price of x-th food product
Income elasticity of demand

$$Eid = \frac{\%\Delta Qdx}{\%\Delta I} \text{ (7)}$$

where:

Eid – income elasticity of demand in percents
$\%\Delta Qdx$ -ditto (6)
$\%\Delta I$-percentual change in income of consumer
Cross price elasticity of demand

$$Epcd = \frac{\%\Delta Qdx}{\%\Delta Py} \text{ (8)}$$

where: $Epcd$ – cross price elasticity of demand in percents
$\%\Delta Qdx$ -ditto (6)
$\%\Delta Py$-percentual change in price of y-th food product

3   Results and Discussion

In terms of food consumption in Slovak republic, it is necessary to consider the fall in milk and milk products consumption (except of fermented milk products), especially in point of view of optimal young generation and other inhabitants groups development requirements. Real conditions for an expansion especially of osteoporosis are created. According to WHO is the osteoporosis one of the biggest health threatening risks of this century in developed countries[34].

Table 1 **Descriptive statistic**

	N	Minimum	Maximum	Mean	Std. Deviation
Qm	19	45,73	76,63	57,1162	9,7142
Qt	19	1,90	2,60	2,1263	0,2050
Qs	19	5,70	11,30	7,6474	1,4163
Qk	19	9,40	18,10	13,4684	2,0355
Valid N (listwise)	19				

Notes: Qt – quantity of curd, Qs – quantity of cheese, Qk – quantity of sour dairy products, Qm – quantity of milk.
Source: Author´s calculations.

In table 1, you can see an overview of basic time series descriptive statistics of milk and milk products of an average Slovak consumer in period 1998-2016.

Consumption of liquid drinking milk is long-term under the recommended consumption determined on 91kg per capita and year. Present day it represents only 50% of recommended consumption. During observed period the annual consumption declined almost by 30kg per capita in average. Liquide drinking milk is important particularly for kids and adolescents. The increase of milk and dairy products with lower fat and salt content (kephir, acidified milk, yoghurt, curd and cheese) consumption is a long-term goal of the Slovak health ministry[35]. There was a lower VAT established on the basic food in 2016. The real effects of this change in VAT are not yet available.

The recommended annual curds consumption is 3.2 kilograms per capita. Not even this food is consumed in sufficient quantity by an average Slovak consumer. Curd consumption in observed period points to a positive tendency. The same trend occurs in consumption of cheeses and fermented dairy products. According

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[34]   http://www.mpsr.sk>
[35]   <http://www.uvzsr.sk>

to a group of nutrition specialists are this one of the healthiest commodities in the group of milk and dairy products.

Table 2 **The demand estimation**

	model	R Square	Intercept	b_1(I)	b_2(Pt)	b_3(Ps)	b_4(Pk)	b_5(Pm)
(t)	power	0,412	-1,206	0,383	-0,569	-0,061**	-0,134**	0,455
(s)	linear	0,853	-3,717	0,002	0,174**	-0,763	-1,229	2,625
(k)	power	0,848	-1,038*	0,242*	-0,507	1,066	0,168**	-0,190
(m)	power	0,951	7,058*	-0,276*	-0,236	0,056**	-0,587	0,273**

(t) – card cottage, (s) – cheese, (k) fermented dairy products, (m) milk, Pt – price of card cottage, Ps – price of cheese, Pk – price of fermented dairy products, Pm – price of milk, (I) income of consumer *Source*: Author´s calculations, *α=0,05;**α>0,50.

Table 3 **Price elasticities**

	curd	cheese	fermented dairy products	milk
Epd(Pt)	**-0,57**	0,01	-0,51	-0,24
Epd(Ps)	-0,06	**-0,58**	1,07	0,06
Epd(Pk)	-0,13	-0,55	**0,17**	-0,59
Epd(Pm)	0,46	0,31	-0,19	**0,27**

Notes: Epd – price elasticities of demand,
Own price elasticities are bold
Pt – price of card cottage, Ps – price of cheese, Pk – price of fermented dairy products, Pm – price of milk
Source: Author´s calculations.

In the table 3 own and cross price elasticities of estimated demand functions of milk and dairy products are showed. Regarding to the own price elasticity, inelastic behavior of the demand for milk and single dairy products was revealed. This fact confirms the knowledges from the economic theory, which considers the food demand as inelastic. The cheese consumer demand is the most responsive on the price change. It is caused by a relatively high price of cheese in comparison to other analyzed food. If the cheese price increases by 1%, the demanded cheese quantity can decrease by 0.57% in average. Demand price elasticity coefficients by fermented dairy products and milk are calculated using the *b* coefficients, which

were estimated with the reliability less than 50%. Therefore we are not going to interpret this coefficients.

It is possible to see the substitution level of milk and dairy products from the calculated cross price elasticities for an average Slovak consumer. Between the pair milk and cheese, the most significant mutual substitution relationship can be seen. Regarding to the estimated cross price elasticity coefficients the rule, with milk price increases of by 1%, the demand for cheese can increases by 0.06% in average, can be applied. If the cheese price increases by 1% an average Slovak consumer will substitute the decreased quantity of cheese by 0.31% increase of the milk demand. This fact is caused by considerably lower price of milk in comparison to cheese price.

A considerable substitution effect on the curd demand has also the milk price change. If the milk price increases by 1% an average Slovak consumer will substitute the milk consumption, as estimated, by an increase of curd consumption by 0.46%.

Table 4 **Income elasticities**

	curd	cheese	fermented dairy products	milk
Eid	0,38	0,91	0,24	-0,28

Source: Author´s calculations.

In table 4 calculated income elasticities of the demand are indicated. As expected, the income change will not cause a considerable change in milk and dairy products demand.

Consumers are reacting to an income change only with small change in food demand. This can be seen mainly on income elasticity coefficients of cheeses and fermented dairy products. If consumer income increases by 1%, this can cause an increase of curd demand by 0.38% in average, c. p. (0.24% increase of the fermented milk products demand, c. p.).

The cheeses demand reacts on income change more markedly. If the consumer income increases by 1%, demand for cheeses increases by 0.91%. Cheeses seems to by the most luxury good from observed food for the average Slovak consumer.

Milk is the only one commodity, which demand will decrease as a reason of income increase. According to higher mentioned analyses, milk isn't very preferred good. Its consumption is long-term decreasing and an average Slovak consumer considers milk as inferior good.

Discussion

The results of *Sall at al* (2015)*,* who estimated demand for meat and dairy products in Sweden,indicated relatively inelastic own price elasticities and high income elasticities for all meat products and slightly lower for dairy products. Demand for food in general tends to be less elastic at higher levels of income and for urban households, *Hoang* (2018). *Wu et al* (2017) estimated the elasticities of demand for different dairy products, such as fresh milk, powdered milk and yoghourt, in China. The major findings showed that fluid milk was the most popular dairy product among urban households in China. Demand for fresh milk was price elastic with the highest value being -1.043, indicating that price-cutting promotion programs could be carried out by dairy enterprises to increase dairy consumption.

4   Conclusion

In contrary liquid milk is the most popular dairy product in some countries. Based on the income elasticity coefficients of the demand, Slovak consumers prefers more cheeses, fermented dairy products and curd, however its consumption is still not sufficient. Regarding to the demand price elasticities, seems the demand for dairy products to be inelastic. The optional support from the government side, for example in form of VAT decrease, should not cause a rapid change in dairy products consumption. It is more effective to influence this consumption by non-price tools, for example by increasing of the awareness.

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FORMATION OF AN EXPORT STRATEGY FOR THE DEVELOPMENT OF BEEKEEPING INDUSTRY IN UKRAINE

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Abstract

The current state and problems of the development of the beekeeping market in the field of the globalization of agro-food markets are investigated in the article. The domestic and foreign markets of beekeeping products, main commodity producers and production volumes in the industry are analyzed. It is established the achievement of success on a current globalized competitive economy is possible. For this purpose Ukraine needs to meet the following certain conditions: saving of ecologically friendly and qualitative parameters of beekeeping production, effective organization of agribusiness and the use of modern marketing tools. This will improve the competitive position on the global market. For now, the best strategy for domestic commodity producers is the protection of acquired positions but in the long term perspective it is necessary to gradually move to the strategy of the growth. In order to achieve the set goals, the destructive influence of macro-environment factors which determine the limited capacity of the domestic market of beekeeping and the inability in certain conditions to have a full-fledged export-oriented orientation of the industry was outlined. The main directions of building an effective export strategy of the beekeeping industry of Ukraine and solving existing problems which inhibit this process are found and proposed.

Keywords: *Beekeeping, family households, profitability, productivity, export strategy*

JEL classification: *C59, D10, F60, Q17*

1 Introduction

With the revitalization of globalization and integration processes, international trade is becoming increasingly important as a component of the country's economic development. The experience of structural adjustment of the economy in the context of expanding world exports confirms the importance of forming an effective export-oriented strategy. The diversity of the resource base, preconditions, means, methods and tools of trade policy of countries, as well as national features exacerbates the need for a comprehensive analysis of the signs of their importance for economic development. The effectiveness of the strategy is determined by the trade structure which is formed under the influence of economic, technological, political, geographical and national factors, domestic and foreign markets, preservation of national identity. Agricultural trends are influenced by the globalization of food markets which is a specific feature of the current and future development of the agro-food market in Ukraine.

Under these conditions, the problem of forming the competitive advantages of agrarian enterprises and the development of competitive relationship in the context of European integration perspectives and strengthening of Ukraine's integration becomes relevant. The consequence of fierce competition in the global dimension is the optimal allocation of resources, the identification of the most promising business entities, their effective functioning and the satisfaction of consumer demand. Domestic consumer market of agricultural products and raw materials in general and beekeeping in particular is actively developed and presented in a wide range. Ukraine traditionally is one of the main producers of honey and can realize its national competitive advantage including the production of beekeeping.

However, in order for Ukraine to have a positive effect and comparative advantages have a long term nature, it is necessary to have an effective market economy and its functioning requires the formation of a proper market environment without it a civilized market is impossible and agrarian in the first place. These provisions cause scientific interest and specify the choice of research direction.

The purpose of the study is theoretical and methodological and practical validation of scientific principles of formation and development of the domestic market of beekeeping, validation of priority directions of realization of industry potential taking into account the globalization of agro-food markets. The object of the research is the procedure of formation and development of the domestic market of beekeeping in the field of global challenges.

The subject of the study is a set of theoretical, methodological and practical aspects of the formation of the domestic market of beekeeping products and the

development of a mechanism for implementation of the industry potential in the field of globalization.

2   Data and Methods

The methodological support of the research is based on the principle of the unity of theory and practice and of the system and synergistic approach which considers the development of industries of agricultural sector from the viewpoint of a holistic paradigm and in the context of the concept of its multifunctional development while taking into account the close interconnection of economic-organizational, socio-political, environmental and natural factors and priorities. The main issues of the development of the beekeeping industry which are considered from the viewpoint of the integrity and continuity of the object, subject and environment, objectives, methods and means of management are identified by this approach.

Data sources for the honey production are mainly compiled from two sources: Food and Agriculture Organization of the United Nations and State Statistics Service of Ukraine.

3   Results and Discussion

Ukraine is the center of beekeeping, because it has good natural and climatic conditions, a large number of honey plant, ethnic bee bears and, above all, the relationship of beekeepers to bees as a "cult". These factors predetermine obtaining of high-quality beekeeping products such as: honey, pollen, propolis, beeswort obesity, royal jelly and others. In general, the beekeeping industry provides a raw material about 40 industries in Ukraine. The production of Ukrainian beekeeping is highly valued in the world markets because it has very high quality and low prices and conform the standards compared to other producers. In recent years, Ukraine has considerably expanded its sales profile and increased exports to the European Union by 7 times. The largest producers of honey are China, Argentina, Turkey, Ukraine and the United States. Only the following countries are provided by beekeeping products of their own production: China, Canada, Ukraine, Russia and Poland. In 2016, the largest share of global exports of honey was in European countries. It is 36.8% which is 825.3 million dollars. The share of Asian exporters is 23.5%, followed by Latin America and the Caribbean region - 14.5%, Oceania - 10.6%, North America - 7.8%. African countries have 6.8% of the volume.

Figure 1 **The structure of world export of honey in 2016**

Source: Development of the author.

In total in 2016, world export of honey was 2.2 billion dollars. Below is given 15 leading honey exporters:
1. China: 276.6 million USA dollars (12.3% of total export of natural honey).
2. New Zealand: 206.7 million USA dollars (9.2%)
3. Argentina: 168.9 million dollars (7.5%)
4. Germany: $ 144.9 million dollars (6.5%)
5. Sierra Leone: 142.4 million dollars (6.4%)
6. Spain: 109 million dollars (4.9%)
7. Ukraine: 108.2 million dollars (4.8%)
8. Mexico: 93.7 million dollars (4.2%)
9. Brazil: 92 million dollars (4.1%)
10. Vietnam: 75.9 million dollars (3.4%)
11. Hungary: 74.2 million dollars (3.3%)
12. Belgium: 72.4 million dollars (3.2%)
13. India: 70.8 million dollars (3.2%)
14. Canada: 54.4 million dollars. US (2.4%)
15. Romania: 41.5 million dollars. USA (1.9%)

The listed 15 countries are 3/4 (77.2%) of all natural honey export during 2016 (by the cost).

Among them, the largest increase in the structure of export in comparison with 2012 has the following countries: Ukraine (by 247.9%), New Zealand (by 98.9%), Brazil (by 75.8%), Spain (by 36.5%), Belgium (by 32.1%) and Vietnam (by 30.6%).

Three countries have a decrease in export of natural honey: Canada (-26.4%), Argentina (-21.4%) and Mexico (-7.7%).

Functioning of national markets occurs in conditions of liberalization of international relationship. It requires an accelerated formation of a fully-fledged national agricultural market capable of providing the balancing supply and demand, increasing the profitability of enterprises and paying capacity of consumers and accelerating the development of rural areas. The procedure of forming a national agrarian market is at the stage of formation and therefore only partially ensures the implementation of the functions and tasks assigned to it. Market failures should be neutralized by measures of state economic and social policy [9].

Competition in the market of beekeeping is intense so business entities are not able to affect significantly at the price level. By qualitative criterion, the structure of the market of domestic beekeeping products is bipolarized due to a small number of intermediaries between producers and consumers. By type, it is polypolic due to the large number of small suppliers and buyers. According to marketing characteristics, it should be attributed to the "buyer's market" where the determining influence belongs to consumers because their low purchasing capacity, the rapid crystallization of most types of honey and the loss by other beekeeping products of consumer properties forces producers to actively do agribusiness. One of the necessary conditions for the integration of agro-food markets into the global economic system is the ability to adapt to the international competition which will ensure long term sustainable development for business entities and for the state. The application of the interdisciplinary approach to the study of the specificity and features of the functioning of the global market for beekeeping products allows to formulate the author's definition of this concept as a complementary international system of institutions which operate in the fields of production, services, distribution, exchange, maintenance, use, regulation, consumption in accordance with the laws of the commodity production, money circulation and social development.

According to the State Statistics Committee of Ukraine, about 2.5 million bee families are in all categories of farms (Table 1) [7].

Table 1 **Dynamics of the number of bee families in Ukraine in 2012-2017**

Indexes	2012	2013	2014	2015	2016	2017	Deviation -%
The presence of bee families in agricultural enterprises, thousands of families	83,9	77,4	71,0	59,0	49,9	47,1	-43,9
Specificweight, %	2,9	2,6	2,4	2,2	1,9	1,9	-
Availability of bee families in farms, thousands of families	2807,0	2858,1	2914,8	2640,6	2540,1	2440,0	-13,1
Specificweight, %	97,1	97,4	97,6	97,8	98,1	98,1	-
Total	2890,9	2935,5	2985,8	2699,6	2590,0	2487,1	-14,0

Source: Calculated according to the State Statistics Committee of Ukraine [7].

Analyzing statistical data, it can be seen that in agricultural enterprises there is a significant decrease in the number of bee families -43.9%, in farms also there is a decrease in the number of families by 13%. These negative trends are explained due to the constant poisoning of bees with pesticides or they have chemical toxicosis.

In most cases, poisoning of bees is due to the late warning of beekeepers about the time, place and nature of chemical treatments, violation of the rules of pesticide use, the deliberately use of hazardous pesticides for bees, airborne debris and spraying. According to Article 37 of the Law of Ukraine "On Beekeeping", natural and legal entities who use plant protection products for treating honey plants must not later than three days before the processing notify the beekeepers whose apiary are located on distance up to ten kilometers from the treated area. In this case, the date of treatment, the name of the drug, the degree and duration of drug toxicity is reported. To combat pests, the range and volume of the use of insecticides are increased. In order to prevent the problem of the destruction of bees, it is necessary to use low-toxic insecticides for them and to choose the correct time and period of treatment of the field. Analysis of statistical data on the development of the domestic industry of beekeeping during the reporting period shows that the number of bee families in all categories of farms is decreased by 14%, from 2890.9 thousand to 2487,1 thousand of bee families.

Table 2 **Dynamics of honey production in 2012-2016**

Indexes	2012	2013	2014	2015	2016	Deviation 2016/2012 -/+
Production of honey in agricultural enterprises	1417	1323	982	918	901	36,41
Specificweight , %	2,02	1,79	1,48	1,44	1,52	-
Production of honey in farms	68717	72390	65539	62697	58393	15,02
Specificweight , %	97,98	98,21	98,52	98,56	98,48	-
Total	70134	73713	66521	63615	59294	15,46

Source: Calculated according to the State Statistics Committee of Ukraine [7].

The lack of a well-organized market for beekeeping products and sufficient legal provision leads to a fall in production level and a reduction in bee families. Such a dynamics has a negative effect not only on the level of production of honey and the export of bee products but also on agriculture as a whole. Because the main bee economic function is pollination of entomophile plants (80% of all agriculture products). In Ukraine, bees are used a fairly small number of farms for deliberately pollination due to insufficient state regulation. After pollination sunflower, fruit berries, vegetables, buckwheat, oilseed and other crops by bees, the level of their yield increases about by 25 -50% [6]. Exactly the income from pollinating agricultural plants by bees creates an additional value of the industry which is significantly exceeds the cost of providing apiaries. However, in all developed countries pollination of entomophile cultures is the main source of income for farmers and the income from the sale of beekeeping products is only 10%.

In geographical terms, the largest number of bee families in all categories of farms is concentrated in Zhytomyr, Mykolaiv and Vinnytsa regions (Figure 2). Production of honey significantly depends on the number of bee families but natural and climatic factors also impact on the production of honey. Ukrainian farms have favorable natural and climatic conditions for the development of beekeeping. The largest sources of honey harvest are agricultural crops, as well as natural honey fields - forests, plantations of gullies and beams, forest belts, meadows and pastures. Beekeeping is located uneven across the country depending on the availability of honey resources and the need for bee families to pollinate agricultural entomophilic crops, gardens and berries., 7 bee families per 100 hectares of agricultural crops in average are placed in the forest-steppe zone, in the Steppe - 6, in Polesie - 5, and in the Carpathians - 4 bee families. The highest concentration

of bee families in the forest-steppe and steppe farms [11]. The main producer of natural honey in Ukraine is the farms which is almost 98.5% in 2016 although their products, as a rule, do not get into an organized market or get into it in small volumes. The specific weight of agricultural enterprises in the production of honey over against decreased by 1.5% over the investigation period. The analysis of the dynamics of production of honey in all categories of farms in the regions of Ukraine shows that the five largest producers of honey include Donetsk - 5.99 thousand tons or 15% of the total amount of honey produced, Mykolaiv - 5.44 thousand tons, Zhytomyr - 8,07 thousand tons

Figure 2 **Production of natural honey in Ukraine in 2016**

Source: Baker Tilly Ukraine/ Info graphic report.

Diagnostics of the environment indicates the destructive impact of macro factors which determine the limited capacity of the domestic market of beekeeping products and the inability under these conditions to have an export-oriented industry orientation. The domestic market of beekeeping products is saturated exactly in the state which it has. The industry of beekeeping and the market in the country are characterized by disorganization which leads to the containment of the industry development and its low efficiency. Promotion of the effective market development of the beekeeping products should be based on structural transformations in the agrarian sector with the simultaneous state support of the industry. Current trends of development and the results of the prediction give base for asserting that the beekeeping industry will gradually develop further by farms. Beekeeping must be developed in accordance with modern agriculture trends on the innovation and industry basis. It is necessary to carry out complex and structural

reforms and to give the industry a priority status. Consequently, it is now feasible to increase the export potential of beekeeping industry with the simultaneous geographical diversification of the markets. It is possible to succeed in a modern globalized competitive economy of Ukraine by preservation of ecologically safe and qualitative parameters of beekeeping products, effective organization of agribusiness and the use of modern marketing tools that will improve the competitive position in the world market. For now, the best strategy for domestic commodity producers is the protection of acquired positions but in the long term perspective it is necessary to gradually move to the growth strategy.

4 Conclusion

Globalization of agro-food markets exacerbates competition at all hierarchical levels prompting economic entities to adapt to the conditions of the environment as much as possible and hold competitive positions on the domestic and foreign markets. Under conditions of globalization, all sectors of national economies become interdependent and complementary and the place and role of the state in the world economy are determined by the number of export industries and the volume and value of environment friendly standardized products. The priority task of the state is the formation and support of strategic export-producing industries capable of creating global products. In Ukraine, beekeeping industry can be considered as such taking into account the following arguments: a) the state is one of the four largest producers of honey in terms of gross production and the level of consumption of this product; b) the products are recognized on the world market for qualitative and taste characteristics; c) There is a high global demand for natural honey and other beekeeping products; d) the niche in foreign markets in the corresponding segment is relatively free; e) the world market of beekeeping products is developing dynamically.

The beekeeping industry of Ukraine is a strategic by the volume of production and the level of actual comparative advantages in foreign trade. However, there are a number of issues in the development of competition in beekeepers which simultaneously manifest themselves at the international and national levels. The main issues are small-scale production, inefficient sales system, a small number of product sales channels, lack of marketing and technology, lack of integration processes, imperfect market infrastructure. Activity in the field of beekeeping as a type of agribusiness is determined by instability, riskiness and does not guarantee profits for extended reproduction. The destructive influence of macro factors also determines the limited capacity of the domestic beekeeping market and constrains the export-oriented vector of development of the industry.

Under these conditions, further research will focus on theoretical and practical justification of the directions of capitalization, formation of market infrastructure of the industry, improvement of the system of state regulation and support of business entities, increase of competitiveness of products and industry. The strategic purpose of the industry development should be the achievement of sustainable and highly effective agricultural production of beekeeping products to meet the needs of the domestic and foreign markets in the corresponding products.

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ALBANIAN GOVERNMENT AND REGULATORY AUTHORITIES SHOULD IMPLEMENT A NATIONAL FINANCIAL INCLUSION STRATEGY FOR FIGHTING AGAINST POVERTY AND ENHANCING SUSTAINABLE ECONOMIC DEVELOPMENT OF THE COUNTRY

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Abstract

This paper presents the issues that Albania is facing related to financial inclusion and the recommendations to be taken in consideration based on results of my qualitative and quantitative research over public reports, surveys and interviews. Albania needs a national financial inclusion strategy for fighting against poverty and enhancing sustainable economic development of the country. This will contribute to achieve the enabling of the easy access and reasonable cost to a whole range of financial services - not just credit but also savings and payments - for individuals (regardless: the low level of income, gender, age, very young or very old, location, rural or urban, etc.) and businesses (regardless if they are: natural or legal person, small or large, with activities in agriculture or commerce, in the village or town, etc.). The financial education is key to understand what you sign when you invest. In Albania the level of financial education is very low which affects the financial decisions of adults, their life and sustainability of Albanian financial markets. Implementing obligatory financial education programs for each target group reduce social effects and intermediaries' financial risks, increase healthy consumption and develop stable financial

markets. Recommendations of this paper demand the involvement of the Albanian Government, because access to financial services could be possible based on reforms.

Keywords: *businesses, consumers, financial inclusion, financial education, financial intermediaries*
Regulatory authorities,

JEL classification: *E44; E58; G28; H77; H81*

1   Overview

Albania is a middle-income country and has generally been able to maintain growth rates and financial stability, despite the ongoing economic crisis. However, growth is expected to stay below the countries potential over the medium term. The financial sector has remained stable throughout the turbulence of recent years.

During these transition years, emigration and urbanization brought a structural shift away from agriculture and toward industry and service, allowing the economy to begin producing a variety of services - ranging from banking to telecommunications and tourism. Nevertheless, agriculture sector is a main source of employment and income in Albania and represents around 22% of GDP while accounting for about half of total employment. Albania's agricultural sector continues to face several challenges, and one of them is limited access to finance and grants.

According to the World Bank Development Group's Global Findex[36] for Albania generated on October 29, 2015. The survey estimated key indicators in Albania, as per table below:

Account (% age 15+)	38%
Made or received digital payments (% age 15+)	22%
Received wages or government transfers into an account (% age 15+)	14%

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[36] The 2014 Global Findex features more than 100 indicators. The database includes indicators on ownership of financial institution accounts and mobile money accounts; use of mobile money accounts for savings and payments; purposes of account use, such as receiving government transfers, wage payments, and agricultural payments; how adults send and receive domestic remittances; savings behavior; use of savings methods, such as banks, and informal savings clubs or people outside the family; sources of borrowing, such as banks, friends, family members; and purposes of borrowing, such as home purchases, school fees, and emergencies. The target population is the entire civilian, noninstitutionalized population age 15 and above. The set of indicators will be collected again in 2017.

Disclosure index (Global Survey on Consumer Protection & Financial Literacy 2013)	3%
SMEs with an account at a formal financial institution (%)(Enterprise Surveys, 2013)	72%
SMEs with an outstanding loan or line of credit (%) (Enterprise Surveys, 2013)	27%

Financial inclusion is a new issue which dates from the 2008 financial crisis and since then all relevant global institutions including the World Bank and the International Monetary Fund (IMF) have placed on their agendas. This implies the involvement of all citizens, especially those from rural areas and those with special needs in financial services but also deepen financial inclusion of those who have a bank account.

2 Access to financial products for Albanians and their businesses

Albania's banking sector is similar in size to its Balkan neighbors in terms of loans and bank capital, but nonbank financial services lag far behind the region. The other non bank financial markets are under developed. The country will continue to struggle to diversify its bank-centric financial sector in the current economic environment. The government remains almost the only issuer of bonds except a few corporate fixed income securities offered privately. Insurance products are still not widely held except compulsory insurance products.

Financial inclusion ensures sustainable access to appropriate financial products for all people and businesses at affordable cost. Financial accessibility is vital for achieving development and economic goals for a country. Having people in Albania with no access to financial products such as current accounts and other financial products, it means they cannot fully participate in economic life of the country. Most of these people live in less-developed cities or villages in Albania.

Even for the Albanians who have a current account and living in urban area; does not mean there is fully the access to finance for them. Even though financial education is integrated as a subject into the last year of the secondary education curriculum, it does not fulfill the needs of Albanian citizens for getting education on financial literacy. Albania does not have a formal strategy for financial education/literacy of its citizens for either adults or children and youth. There is the risk, they make wrong decisions and assume obligations they cannot meet in the future. The financial services consumers' lack of knowledge can undermine their financial resilience.

2.1 Access to finance/credit

Banking sector assets account for 93 per cent of total financial system with 16 banks operating in the market (in total 500 branches/agencies). The total banking assets in Albanian banking activity is concentrated, four biggest banks in Albania have almost 68% of total banking assets and the level of non-performing loans still remains high at 15.9% as per BoA data of May 2017. According to BoA expert, cleaned from the write-off effects, the annual growth of the total loan portfolio in April remained modest, at 3 percent. However, the BoA expects lending activity to improve gradually in the quarters ahead, reflecting the expected expansion of demand and improvement of supply (Source: Xinhua| 2017-07-07).

Access to banking services remains very limited in Albania, although modest improvement is seen in most of the indicators. There are no positive trends regarding numbers of bank branches, ATMs, POS, etc. Based on a report of IMF, Financial Access Survey: "The value for Commercial bank branches[37] (per 100,000 adults) in Albania was 21.91 as of 2013. Over the past 9 years this indicator reached a maximum value of 22.42 in 2009 and a minimum value of 9.11 in 2004; the value for Borrowers[38] from commercial banks (per 1,000 adults) in Albania was 136.05 as of 2013. This indicator reached a maximum value of 140.14 in 2012 and a minimum value of 13.42 in 2004." Todays, with the new acquisitions in the banking sector during the end 2017 (American Bank of Investment bought National Bank of Greece, Albania) and beginning of 2018 (Tirana Bank, member of Piraeus Bank is in the process of selling its shares and another existing bank in the market might be the buyer), we might assume that these indicators will decrease in the future.

In the absence of a state-owned bank in Albania, the government cannot influence directly the banks to be present in every location for increasing the access to finance of the Albanians, despite their location being in west or east, in city or village, in Tirana or Tropoja or Ksamil. It should not be concluded that government ownership is either the best or the cheapest way in which to maintain rural access to the banking system, knowing the costs and bad administration of state owned banks and poor lending practices, however, the government must find solutions for increasing the financial inclusion of Albanians.

A more effective – and cheaper – approach to foster outreach may be to provide grants to private banks to increase their rural presence using lower cost mechanisms (such as mobile offices and new technologies such as mobile payments)

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[37] Are retail locations of resident banks that provide financial services to customers
[38] Are the reported number of resident customers that are nonfinancial corporations (public and private) and households who obtained loans

and reinforce this by promoting the development and regulation of non-banking institutions such as the stated owned Albanian Post (500 branches/agencies all around Albania).

2.2 Compared to EU businesses, the Albanian businesses often face obstacles in securing access to credit sources.

 Some obstacles originate from the lack of investment or credit readiness of the Albanian businesses, such as inadequate or non-existent business planning, accounting practices and book keeping, lack of awareness and knowledge about financing options and instruments, and economic informality. According to OECD Report (Access to Finance & Innovation in The Western Balkans Findings from the Small Business Act Assessment,1 March 2017), Banks remain the most important source of credit for SMEs which have been disproportionately affected by credit constraints; Domestic credit to the private sector as a share in GDP has decreased between 2009-2014; Albania has the lowest ranking in the region[39] for Government financial support services for innovative SMEs.

Bank finance in Albania is a major and almost the only source of external finance for businesses. However, obtaining credit is one of the top five challenges of **doing business** in Albanian economy according to the latest EBRD survey of 2014. The banks should effectively fulfil their role as intermediaries between owners and users of funds for ensuring a more efficient allocation of financial resources. According to the latest report of World Bank related to domestic credit to the private sector[40] over GDP, the report for 2016 is 40.55 compering to 40.61 for 2015 and based on the report of WB Doing Business[41] (Getting Credit) for Albania, as per Credit Register database the number of borrowers is 648,828 individuals and 19,002 businesses.

The competition in the banking sector measured by the degree of concentration in the banking sector, which is captured by the share of total assets controlled by the largest banks and the additional information on the degree of state and foreign ownership in the banking system. Even knowing that around 90 per cent of the banking system capital share in Albania is owned by foreign capital, Albania considered having issues in concentrated banking sector which might result in a lack of competitive pressure to attract savings and channel them efficiently to investors.

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[39] Albania, Kosovo, Macedonia, Montenegro, Serbia, Bosnia & Hercegovina
[40] ttp://data.worldbank.org/, as per data of November 2016
[41] http://www.doingbusiness.org/

Albanian Competition Authority (ACA) in January 2011 after a monitoring process issued a decision regarding the banking sector and its transparency in the banking services (Decision no 174, dated 25.01.2011). During 2015-2016 the authority has conducted a general investigation to assess if there are distortions or restrictions of competition in relevant banking market. The investigation procedure has been concluded but the decision-making is still in process. Albania might lose the benefits of competition in the financial sector which are the enhanced efficiency, the provision of better products, increased innovation and credit interest rates.

2.3   Access to other financial products

Non-bank financial institutions (licensed and supervised by AFSA) are still at early stages of development. The indicator of total assets of all three financial markets, *insurance* market, voluntary pension funds and investment funds were 6.7% of *GDP at the end of* 2016. While, during 2016 the Albanian *insurance* industry continued a pace of expansion with *total assets* to *GDP* of 2.2% in 2016. According to BoA (Financial Stability Report 2017 H1, page 44, July 25, 2017), *Total* share of banking sector *assets* decreased at 91.9% of *GDP*, against 94.9% at the end of 2016. The contribution of these markets to GDP is increasing slowly during years, further limiting private sector's access to financial products as well. As per following the table "Share of financial system segments[42] in GDP, over years" (Financial Stability Report 2017 H1, page 44, July 25, 2017)

Licensing and supervising authority	Financial system	2011	2012	2013	2014	2015	2016	2017 H1
Bank of Albania	Banking sector	84.7	89.6	90.5	91.7	91.3	94.9	91.9
	NBFIs	2.5	2.7	2.5	2.7	2.7	2.9	2.8
	SLAs and Unions	0.7	0.8	0.8	0.8	0.7	0.6	0.5
Financial Supervision Authority	Insurance companies	1.5	1.6	1.6	1.7	1.9	2.1	1.9
	Pension funds	0.01	0.02	0.03	0.04	0.1	0.1	0.1
	Investment funds		1.21	3.7	4.5	4.7	4.4	4.7

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[42]   The financial system consists of banks, non-bank financial institutions, savings and loan associations (SLAs), insurance companies, private supplementary pension funds and investment funds.

Licensing and supervising authority	Financial system	2011	2012	2013	2014	2015	2016	2017 H1
	Financial intermediation	89.41	95.93	99.13	101.44	101.3	105.1	101.9

The insurance penetration rate has increased in 1.04% in 2016 compared with 0.98% in 2015, but still remains scope to increase this indicator at least to the level of the region (Kosovo1.39 %, Montenegro 2.15%, Macedonia 1.51% and Serbia 2.15%). Regarding the extent of the use of insurance products by the population, in 2016, premium per capita averaged 5.370 Lek (39.09 euros), an increase of 490 Lek compared with a year ago. The premium per capita in the non-life insurance for 2016 averaged 5,000 Lek. Also, over 90% of the banks' branches are in urban area. The definition of branch is expanded to include all types of access points - agencies, pay-points, mobile units, satellite branches, and sub-branches.

The growth of the insurance market is mainly driven by the growth dynamics of compulsory motor insurance during 2016, or 61.56% of total gross written premiums of non-life insurance. The average premium for compulsory motor insurance in Albania is approximately 115 euros from 109 euros that was the premium level in 2015. By comparison with countries in the region note that Albania has a premium level higher than Macedonia (88 euros) and Croatia (102 Euro) but lower than Kosovo (137 Euro) and Bosnia and Herzegovina (145 Euro). The report of claims paid over insurance market premiums for non-life results 38.75% in 2015 from 35.75% in 2014. During 2016 claims paid were about 31.16 million euros, or about 17.53% more than in 2015.Most claims paid belong to motor insurance with about 18.93 million euros or 61.65% of the total.

2.3.1 The establishment of other external finance (bonds, stock exchange, etc.) enables Albanian businesses

The establishment of other external finance (bonds, stock exchange, etc.) enables Albanian businesses to meet working capital requirements, fill temporary gaps in the cash-flow cycle and support expansion plans, leveraging the internal resources (the investors' equity contribution and/or retained profits). Compared to EU businesses, the Albanian businesses often face obstacles in securing access to such external financing sources.

The Tirana Stock Exchange, TSE, opened in 1996, shortly before the fraudulent pyramid investment scams. Some of those investors lost houses and herds of cattle when they sold their possessions to get a 300 percent return on their investment in 90 days (Thomson Reuters, OCTOBER 19, 2017). TSE never gained

the trust of local businesses, remaining a ghost financial institution up to 2014, when the Ministry of Finance frozen it. AFSA licensed Albanian Securities Exchange on 3 July 2017, with a registered capital of 50 000 000 Lek (approx. EURO 370 000). The ALSE has three shareholders, Credins Bank with 42.5% of the capital, American Investment Bank with 42.5% of capital and AK Invest Company with 15% of the capital. The Albanian Securities Exchange, which will trade Albanian government securities up to July 03, 2018 and will trage corporate bonds and equities after July 03, 2018. ALSE began trading securities on February 22, 2018. According to the statistics published by ALSE: "ALSE in its early days has reported a satisfactory volume of EURO 5 million, although the number of transactions is still limited. In seven transactions registered on the ALSE, five of them involved treasury bills and the two other government bonds". According to Thomson Reuters, (Big Story, October 19, 2017), people (albanians) like this tend to see securities trading as fraud, making it an uphill struggle for ALSE's team to persuade them otherwise. ALSE must operate effectively with transparenc and accquarecy for supporting access to finance but caring for investors as well.

The survey over access to finance for Albanian businesses, shows; access to bank finance is constrained by uncertain prospects of success, long time-horizons, account book keeping, fair competition, a lack of tangible assets that can be used as collateral and a limited operating history. Therefore, access to a sufficiently broad range of business financing instruments is desirable to obtain the form and volume of financing to specific needs and the stage of the business life-cycle. Also, some other obstacles originate from the relationship between the providers and users of such external finance, in particular, information asymmetries, moral hazard (which can be amplified by the limited capitalisation of small enterprises) and relatively high transaction costs. However, equity finance, is needed to strengthen business' capital structure and boost investment in innovative start-ups and high-growth. Also critical for more mature firms which can raise capital in stock markets, access to equity finance is an important feature of a competitive environment that supports business creation and expansion.

Stock markets allow investors to trade their stakes, realise capital gains and eventually redirect their capital into new investments (UNECE, 2009). For Albanian businesses access to stock markets is difficult, however public listings of business equity can help to provide funding, particularly for innovative, start-ups and high-growth businesses. Specialized listing platforms[43] for "new markets", can offer more flexible listing criteria, eased disclosure requirements and comparatively low admission cost, which enable businesses better access compared to

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[43]   Equity-based crowd funding is another instrument listed by the G20/OECD High-level Principles on SME Financing.

generic stock exchanges (OECD, 2015). Alternative financing instruments could be relevant in Albania. This could include other instruments of asset-based lending, alternative (besides leasing and factoring) debt instruments (e.g. corporate bonds, securitized debt, covered bonds, private placements, crowd funding), and/ or equity instruments.

2.4 Other findings related to financial inclusion of Albanians and their businesses

Credit information services. The use of credit information is recommended to improve risk management for lenders and access for borrowers. The quantity of information includes the type of information collected (positive, negative or both) and the existence of historical data. Efforts to increase the number and types of information providers (financial institutions as insurance companies, brokers, etc.; utility companies, etc.) are also considered. Well-functioning public and private credit information systems and bureaus provide information on borrowers, including firms and individuals, reducing information asymmetries between lenders and borrowers, increasing market transparency, encouraging greater investor participation and reducing financing costs for the Albanian businesses. They enhance lenders' ability to verify the indebtedness and repayment history of borrowers and increase borrowers' cost of default.

2.4.1 The search on financial education

*The search on financial education*conducted, approaching the OECD guidelines. Albania has a financial system relatively new and therefore knowledge, experience and customer relations are still in the early stages of development. About the relationship between financial inclusion and demographic features, noted that the more educated (moreover, recognition of basic financial concepts) people recognize and use financial products. The financial products are known and used more by men than women, and individuals belonging to the age group 30-59. Also, 50% of interviewees admitted that when they are caught in a situation of insufficient income have chosen to borrow from friends or relatives to get out of the difficulty, without demanding the credit institutions.

Albanian Financial Supervisory Authority (AFSA) since December 2016 started signing Memorandums of Understanding for joint activities and initiatives for financial education with Economic Faculties in Albania and during 2017 progressed all around Albania. BoA as every year at March 2018 organized the "Money Week" with some activities related to financial education. Are those enough? Even though, BoA and AFSA are key players for sustainable economic

development of Albania, but there should be a national coordinated strategy with other stakeholders as well to set up joint initiatives for improving financial education and encouraging financial inclusion.

2.4.2 Consumer protection

Consumer protection will be effective only if the customer actively protects its rights. It is important that citizens are increasingly requiring information to compare terms and conditions of financial products and most importantly is that they raise their voice if they encounter problems. Mistakes happen, so financial institutions should be aware of the mistakes and be given the chance to correct them. Also, financial education increases the ability, freedom and confidence of families and companies to better manage their finances, considering the economic and social side. But, to be implemented the program for consumer protection requires intervention in the regulatory and legal framework for consumer protection in the financial sector, strengthen market supervision, dispute resolution where customers will be provided with mechanisms to protect pro-actively their rights. Without adequate consumer protection, the advantages of financial inclusion may fade.

3   Recommendations

Albanian Government in cooperation with international institutions (as exp. WB, OECD, etc.) must develop a national strategy for its financial inclusion, with measurable objectives in short and long term. Some measures to be taken as soon as possible for enabling financial inclusion, as per following:

- Implement obligatory financial education programs for each target group providing knowledge over financial products; therefore, reduce social effects and financial risks, increase healthy consumption and develop stable financial markets;
- Authorities to amend the legal and regulatory framework for consumer protection approaching EU Directives, OECD principles and best practices by developing countries to enable competition not concentration, transparency, access to finance for vulnerable segments and quality financial services.
- Create credit information system for generating credit scoring as an important factor for access to finance (credit, and healthy lending to Albanian consumers), reduction of costs and facilitate financial inclusion for other financial products as insurance, investment funds, pension funds, etc.;
- Reducing to zero online banking fees, commissions for payments with bank cards in POS-es, commissions for getting information and maintaining a bank account, which are increase sing significantly by commercial banks in Alba-

nia during these last years. Asking transparency over terms and conditions of financial products, informing their customers in an understanding and sustainable way of communication, reduce the risks and boost financial inclusion;

- Developing corporate bonds and stock exchange services for generating other sources for raising capital to business, requires urgent measures for insuring transparency and confidence to investors through effective supervision over financial intermediators and financial statements of listed companies;

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RISKS TO BE MANAGED FOR MOBILE PAYMENTS IN ALBANIA

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Abstract

Regulatory Authorities in Albania need to start paying more attention to consumer-related issues and define some standards to which partners (Banks, MNOs/Mobile Network Operators, etc) need to adhere so as to ensure higher consumer satisfaction and protect financial stability. Consumers are not sure who to approach if and when they have complaints related to mobile money, especially when they involve in an issue. This happened to countries focusing on attracting investment and providing an open ground for innovation without thinking allover. Potential areas of action include: partners (Banks, MNOs, etc) providing mobile money services should define some quality metrics that can be tracked over time to ensure improvements. Performance across these metrics should be periodically disseminated to the public for reasons of transparency and accountability. Use of mobile money creates lots of data and a trail that can be followed. This can be used for both good and bad objectives. It is therefore important to specify who can have access to this information.

Keywords: *Banks, Customers, Mobile Money, Regulatory Authorities*

JEL classification: *G21; G28; E4; O3*

1   Introduction

"Mobile Money" is electronic money that can be accessed and used for "Mobile Payments" which are payments via mobile phone. Today, mobile subscribers in markets are beginning to use mobile money for transactions and services, including domestic and international remittances, bill payment, payroll deposit, loan

receipt and repayment, and purchases of goods and services ranging from prepaid airtime to groceries to bus tickets to micro insurance. There is no limit to the range of transactions and services for which mobile money could eventually be used. As a result, mobile money has significant implications for economic activity across the board.

Source: IFC

Mobile money, facilitates the flow of money from one party to another using a communications infrastructure that already connects billions of customers around the world – far more customers than currently have bank accounts. In an increasing number of developing countries, millions of poor people are using basic mobile phones to transfer money; pay for goods; and access sophisticated financial services, such as credit, insurance, and savings accounts[44]. As "mobile money" becomes commonplace, research is shifting from studying design and adoption to assessing impact[45]. Although impact assessment remains nascent, that which does exist has been criticized for lacking rigorous conceptual or theoretical approaches, and instead, relying heavily on practitioner surveys, rather than academic research[46].

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[44] Donovan, 2012
[45] Donner & Tellez, 2008
[46] Duncombe & Boateng, 2009

2   Some definitions of "Mobile Money"

Falls within definition of electronic banking; …includes provision of retail and small value banking products and services through electronic banking channels as well as large value electronic payments and other wholesale banking services"[47]; "Mobile money" consists of financial transactions that are conducted using a mobile phone, where value is stored virtually (e-money) in an account associated with a SIM card. Individuals can deposit cash onto a mobile account, make transactions between accounts, and withdraw funds as cash; "Mobile payments" provision of payment services through the use of mobile phones…

As the cost of mobile phone technology have fallen, and as the technology has been adapted to support financial services, mobile banking innovations have begun to spread across and within poor countries. The low cost, and the unmet demand for financial services, as captured by low rates of bank physical access, means that mobile banking has the potential to reach geographic, spectrum. These advantages are particularly pronounced in developing countries.

Types of Mobile payments recently introduced are still at an early stage of development and deployment, the use of mobile technology for payments may result in additional security exposures attributable to:

1. The fact that the current generation of mobile devices and their operating systems were generally not designed with the security of payments in mind;
2. The reliance on radio technology (i.e. wireless small range technologies such as Bluetooth and Near Field Communication (NFC) or the over-the-air (OTA) data channels provided by the mobile network operator) for transmission of sensitive payment data and personal data;
3. The involvement of additional actors, such as mobile network operators (MNOs) and trusted service managers (TSMs), compared with traditional payments; and
4. The general reduced security awareness of mobile device users or unsafe customer behaviour.

Indeed, the network power of mobile money as a whole—interoperable between many providers—would actually increase, potentially challenging cash's dominance. Already, some are advocating an "anti-cash movement"[48], and major development organizations and private sector entities have formed the Better than Cash Alliance to support electronic payments, presenting cash as an anachronism: expensive to manage, easy to lose, and prone to illicit usages. Although

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[47]   BIS Risk Management
[48]   Sridharan, 2012

it is generally unwise to take a teleological approach to technology[49], and it is unlikely that mobile money will wholly displace cash any time soon[50].

As a new technology for payments, face the particular challenges that customers' perception of security is a basic condition for the use of mobile payment services, and that security incidents could (temporarily) damage the image of mobile payment services. A number of regulatory issues and potential policy actions should be discussed. The issues relate to consumer protection, registration and transaction limits, agent networks, interoperability, taxation as well as collaboration between regulators both within and across

3   The Challenges and conclusions that we can meet

Some traditional risks modified; Risks (operational, legal, reputational risk); Structure and function of financial institutions; Privacy concerns Information security concerns; For supervisors: operational risk and reputational risk. (Security, outsourcing and vendor management); Law inevitably lags behind technology and Implications for regulators; Reliance on third party service providers; Balancing act: access v over-regulation; Cross-border (mobile money transfer) less developed; Various trade-offs: in payment system, trade-off between regulating the institution v product, inclusion v integrity.

4   Mobile banking and mobile payments in Albania

Referring to the available data, **home banking**[51] is increasingly expanding in the Albanian banking market. Since the introduction of this product in 2005 till in December 2013 the result is that 11 banks provide e-banking. The growing number of these accounts is followed by growing e-banking transactions in terms and value, but recent trends on electronic payments show a positive slow step and paper based (SWIFT) money transfers yet is dominating. The above-mentioned development may factorise an extension of the use of this instrument to a wider range of users. More specifically, while this instrument was initially provided only by one bank and was meant for large companies. Meanwhile, boosted competition in this segment of the market and the subsequent decrease of costs, as well as familiarisation of the public with this alternative payment instrument, led to

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[49] Edgerton, 2007
[50] Maurer, 2011
[51] Meaning internet banking, phone banking, mobile banking, etc

its use by other user categories. During recent years is noticed an increase: In the number and the value of transaction made through home banking in Albania and in the number of accounts accessed through internet. However, the utilization of the instrument has shown a negative trend, firstly introduced in Albanian market as product targeting only for private companies.

We must specify that internet banking is the leading service among the home-banking services in the Albanian banking market. But seeing it in a regional perspective, Albania appears to have the lower level in the region in term of home banking use (Graph 1.). While, the Albanian market has shown increase in the electronic banking channels as ATMs and POSs and in terms of payment cards has shown increase in the number of debit and credit cards.

Graph 1 **Home banking transaction per 1 million inhabitants (Authors)**

Acording to Bank of Albania report, the number of credit and debit cards issued by private banks increased by 54% and, the total number of cards in use is estimated to be 870 thousand, one in three Albanian citizens owns a debit or/and credit card (Albania has a population of 2.9 million). But, debit cards which are linked to current accounts are frequently used by Albanians compared to credit cards estimated to be only 78 thousand credit card holders. However, card transactions in Albania are dominated by cash withdrawals (ALL 109 billion of card transactions, where 92% of them were cash withdrawals).

Following the above, we will present some quantitative information, specifically for the mobile payments service generated by analysing the data of 6 banks which actively offer these services in Albania.

Graph 2 **Quantitative information for the mobile payments service (Authors)**

Below you will find a list of the most typical transactions performed through the mobile banking service done through authorisations[52] and check over credentials[53] in Albania: transfers of funds between the accounts of the same client within the same bank; transfers of funds between different clients within the same bank; transfer of funds in another bank in Albania; payment of bills (utilities; credit carts ect.); etc

Mobile banking activity in Albania is offered only by banks because our Banking Law did not permit non-banking financial institutions to have deposits or repayable funds from the public which would make possible the transfer of funds or other transactions from the client's account. In such circumstances, even the nonbanking financial institutions which aim to offer this activity, or already can, have to perform monetary transactions only through bank accounts (client's bank account and nonbanking institution bank account).

The new changes in the Banking Law, made possible the introduction of a new kind of financial activity in Albania, the e-money issuance as well as the establishment of the E-money institutions. The Supervisory Council of Bank of Albania approved on January 17th, 2013 the regulatory framework amendments related to the e-money institutions licensing and supervisory procedures. Such e-money institutions, in difference from the other non-banking financial institutions (NBFI), can collect "deposits" from the public, even though the name "deposit" in this case, does not have the same meaning with that of a bank deposit. The

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[52] A procedure that checks whether a customer or PSP has the right to perform a certain action, e.g. the right to transfer funds, or to have access to sensitive data.

[53] The personal and confidential information provided for the purposes of authentication. Credentials can also refer to the physical tool used for obtaining the information (e.g. one-time-password generator, smart card), or to something the user memorises or represents (such as biometric characteristics

Banking law states clearly such difference. That is the new facility BoA offered to the market, in compliance with the EU Directive on E-money institutions. BoA open the possibilities for NBFI (Non-Bank Financial Institutions) to enter in this activity offering to customers the service of making transactions by using cards, mobile phones or internet, to perform low value transactions through e-money institutions.

5 Mobile payments, a new technology for payments

Mobile payments can take several forms, but a generic definition, as defined in the 7th SEPA Progress Report (2010), is "payments for which the payments data and the payment instruction are transmitted and/or confirmed via mobile communication and data transmission technology through a mobile device[54] between the customer and his/her payment service provider in the course of an online communication.

In one typical use case of mobile payments, the initiation of the payment takes place through a wireless communication between the customer's mobile device and the merchant's payment terminal (e.g. using NFC capability pre-installed on the mobile device or delivered separately on a SIM or SD card). In another use case, the initiation of the payment may take place through the scanning of a QR (Quick Response) code provided by the merchant (e.g. on display at the cash register, generated by its payment terminal, in a printed publication, or on the e-commerce website) followed by a wireless or over-the-air communication between the customer's mobile device and the mobile payment solution provider using an MNO's network or a Wi-Fi connection and the internet. In yet another use case, mobile payments are used for person-to-person (P2P) payments. Further use cases exist and are still being developed. These payments are internet payments.

- Strong customer authentication is a procedure based on the use of two or more of the following elements – categorised as knowledge, ownership and inherence:

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[54] For the purpose of this document, a mobile device is a handheld machine: (i) connected to other devices or systems via radio technologies or via telecommunication networks based on wireless ("over-the-air") technology (e.g. GSM/GPRS/UMTS, Wi-Fi, NFC, RFID, Bluetooth); (ii) designed with a multimedia interface for user interaction (e.g. display, keyboard, sound-speaker); (iii) equipped with a storage facility for "user identification data" (for instance a SIM card, other UICC, or a micro-SD card); and (iv) equipped with a mobile operating system.

- something only the user knows (e.g. a static password, code or personal identification number);
- something only the user possesses (e.g. a token, smart card or mobile device); and
- something the user is (e.g. a biometric characteristic, such as a fingerprint). In addition, the elements selected must be mutually independent, i.e. the breach of one does not compromise the other(s).

At least one of the elements should be non-reusable and non-replicable (except for inherence), and not capable of being surreptitiously stolen. The strong customer[55] authentication procedure should be designed in such a way as to protect the confidentiality of the authentication data. As an example, where a static password or PIN is used as an element to perform strong customer authentication, as referred to in the Payment Services Directive[56].

Types of mobile payments are still at an early stage of development and deployment, the use of mobile technology for payments may result in additional security exposures attributable to:

- the fact that the current generation of mobile devices and their operating systems were generally not designed with the security of payments in mind;
- the reliance on radio technology (i.e. wireless small range technologies such as Bluetooth and Near Field Communication (NFC) or the over-the-air (OTA) data channels provided by the mobile network operator) for transmission of sensitive payment data and personal data;
- the involvement of additional actors, such as mobile network operators (MNOs) and trusted service managers (TSMs), compared with traditional payments; and
- the general reduced security awareness of mobile device users or unsafe customer behaviour.

Mobile payments, as a new technology for payments, face the particular challenges that customers' perception of security is a basic condition for the use of mobile payment services, and that security incidents could (temporarily) damage the image of mobile payment services.

Customer trust in mobile payments is all the more important, given that the mobile technology can introduce previously "remote" payment instruments and solutions into the "bricks-and-mortar" environment; mobile payments are therefore an alternative for cash, cheques and "card-present" payments. For

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[55] Customers include both consumers and corporate entities to which a payment service is provided
[56] e the definition of low-value payment instruments in Articles 34(1) and 53(1) of the Payment Services Directive

card-present payments, a high level of security has been reached throughout Europe thanks to the efforts made over recent years migrating cards and payment terminals to the EMV specifications, which allow for robust card authentication (e.g. by using dynamic or combined data authentication) and cardholder verification (PIN), together forming strong customer authentication. For mobile payments at the point of sale, an equivalent level of security should be aimed for. Similarly, for those mobile payments that compete with internet payments, an equivalent level of security should be aimed for as in the *Recommendations for the security of internet payments*. For both use cases, the specific vulnerabilities and threats, as well as the opportunities, related to the use of mobile technology for payments should be taken into account.

6 Recommendations

Consumers are not sure who to approach if and when they have complaints related to mobile money, especially when they involve in an issue. This happened to countries focusing on attracting investment and providing an open ground for innovation without thinking allover. Regulators need to start paying more attention to consumer-related issues and define some standards to which partners (Banks, MNOs[57], etc) need to adhere so as to ensure higher consumer satisfaction and protect financial stability. Potential areas of action include: partners (Banks, MNOs, etc) providing mobile money services should define some quality metrics that can be tracked over time to ensure improvements. Performance across these metrics should be periodically disseminated to the public for reasons of transparency and accountability. Use of mobile money creates lots of data and a trail that can be followed. This can be used for both good and bad objectives. It is therefore important to specify who can have access to this information.

1. Governance

Mobile Payment Solution Providers (MPSPs) should implement a formal security policy for mobile payment services which is subject to periodic review, monitoring and challenge being complient with regulatory framework of Governance authorities[58] (of a payment instrument scheme) .

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[57] Mobile network operator
[58] The entity accountable for the overall functioning of the scheme that promotes the payment instrument in question and for ensuring that all the actors involved comply with the scheme's rules. It is responsible for ensuring the scheme's compliance with oversight standards. European Central Bank (2009), Harmonised oversight approach and oversight standards for payment instruments.

2. Risk assessment

MPSPs should identify and assess risks on an ongoing basis (supported by a formal policy and strategy) in order to ensure the security of mobile payments and ancillary services, but also prior to establishing the service(s).

3. Security incident monitoring and reporting

MPSPs should ensure the consistent and integrated monitoring, handling and follow-up of security incidents, including security-related customer complaints. MPSPs should establish a procedure for reporting such incidents to management and, in the event of major payment security incidents, to competent authorities.

4. Risk control and mitigation

MPSPs should implement proportionate security measures aligned with the risks in order to mitigate identified risks. These measures should incorporate multiple layers of security, whereby the failure of one line of defence is mitigated by the next line of defence ("defence in depth").

5. Traceability

MPSPs should have processes in place ensuring that all transactions are logged with an appropriate audit trail.

6. Initial customer identification[59] and provision[60] of information

MPSPs should properly identify customers (payers and payees) in line with the European anti-money laundering legislation[61] and should obtain the confirmation of their willingness to make and/or to accept mobile payments using

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[59] The customer identification process is without prejudice to any exemptions provided for in existing anti-money laundering legislation. PSPs (Payment Service Provider, as defined in the Payment Services Directive) do not need to conduct a separate customer identification process for the mobile payment services, provided that such customer identification has already been carried out by them, e.g. for other existing payment-related services or for the opening of an account. For example, a passport, a national identity card or an electronic identification with an adequate electronic signature and certificate.

[60] This information complements Article 42 of the Payment Services Directive which specifies the information that the PSP must provide to the payment service user before entering into a contract for the provision of payment services.

[61] For example, Directive 2005/60/EC of the European Parliament and of the Council of 26 October 2005 on the prevention of the use of the financial system for the purpose of money laundering and terrorist financing, OJ L 309, 25.11.2005, pp. 15-36. See also Commission Directive 2006/70/EC of 1 August 2006 laying down implementing measures for Directive 2005/60/EC of the European Parliament and of the Council as regards the definition of "politically exposed person" and the technical criteria for simplified customer due diligence procedures and for exemption on grounds of a financial activity conducted on an occasional or very limited basis, OJ L 214, 4.8.2006, pp. 29-34.

the services before being granted access to such services. MPSPs should provide adequate "prior", "regular" or, where applicable, "ad hoc" information to the customer about the necessary requirements (e.g. equipment features, procedures) for performing and/or accepting secure mobile payment transactions including the inherent risks.

7. Strong customer authentication

MPSPs should ensure that the initiation of mobile payments, as well as access to sensitive payment and personal data, is protected by strong customer authentication. MPSPs should ensure that customer enrolment for and the initial provision of the customer's authentication tools and/or the delivery of software required to use the mobile payment service is carried out in a secure manner. MPSPs should limit the number of log-in or authentication attempts (e.g. wrong PIN entries), implement time-out controls and set time limits for the validity of authentication.

8. Transaction monitoring

MPSPs should operate transaction monitoring mechanisms designed to prevent, detect and block fraudulent payment transactions; suspicious or high-risk transactions should be subject to a specific screening, filtration and evaluation procedure.

9. Protection of sensitive payment data and personal data

Sensitive payment data and personal data should be protected when stored, processed or transmitted.

10. Customer education and communication

MPSPs should provide assistance and guidance to customers, where needed, with regard to the secure use of mobile payment services. MPSPs should communicate with their customers in a manner that reassures them of the authenticity of the messages received.

a) Through the secure channel, MPSPs should keep customers informed about updates to security procedures regarding mobile payment services.

b) MPSPs should initiate customer education and awareness programmes designed to ensure that customers understand, at a minimum, the need: to protect their passwords, PIN codes, personal details and other confidential data; to manage properly the security of the personal device (e.g. mobile handset), through installing and updating security components (antivirus, security patches);

c) It is desirable that MPSPs offering acquiring services arrange educational programmes for their merchants on fraud prevention.

d) It is desirable that MPSPs and third parties such as the MNOs draft appropriate customer education and communication policies based on a common understanding of risks.

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INSTITUTES OF STABILIZATION OF CONJUNCTURE IN THE GRAIN MARKET OF RUSSIA

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Abstract

The article analyses the institutional mechanisms for stabilizing the agro-food market in the grain market. The offers on the adjustment of national institutional mechanisms for commodity-purchasing interventions, price regulation, as well as the Institute of storage intervention fund.

Keywords: *institutions, agro-food conjuncture, intervention measures*

JEL classification: *E32; O13; O43*

1 Introduction

The transition of Russia's agriculture to the stage of relative saturation of demand in the agro-food market is characterized by an increase in the amplitude of short-term price fluctuations in agricultural markets. The "Law of King" manifests its effect: when the elasticity of demand decreases, there is an increase in the dependence (elasticity) of changes in market prices from changes in the volume of production and sales of products.

With inelastic demand, even small changes in production volumes cause a much greater degree of change in market prices. In connection with this, a definite regularity can be clearly observed. The development of the agrarian sector of the economy leads to an increase in the degree of saturation of food needs, which, in turn, causes a drop in the elasticity of demand for income and prices. The

drop in the elasticity of demand strengthens the volatility of market prices. An increase in the level of price fluctuations (especially in the grain economy) leads to instability in the receipt of income from agricultural producers and reduces the investment attractiveness of the industry. In such circumstances, the opportunities for long-term economic growth of the agricultural sector are lost, the market mechanism cannot independently restore the prices of effective competitive equilibrium. This allows us to conclude that to stabilize the agro-food situation, government intervention in the grain economy is necessary through the institutional mechanisms that regulate supply and demand in the market.

2 Data and Methods

Theoretical model of institutes and institutional mechanisms of stabilization of price conjuncture in the grain market. Ensuring a stable price environment without divergent amplitude of its fluctuations cannot be achieved through a market impact on supply and demand in the agro-food market. It is impossible to solve this problem by applying separate measures of state influence on the market situation. It is necessary to form a special complex system of institutions and institutional mechanisms for stabilizing the price situation in the agro-food market, in particular, in the grain market. The creation and use of such a system makes it possible to mitigate price fluctuations in the grain market, which makes it possible to form stable incomes for agricultural producers (sufficient for extended reproduction) and to invest in the industry in a "more predictable" environment.

The construction of such a system of institutions should take into account the ambiguous position of participants in the grain market relative to the main goals of stabilization operations. From the point of view of grain producers, the main goal is to raise prices to ensure the profitability of agricultural producers, sufficient for maintaining extended reproduction. The main goals of grain producers and consumers (the population, representatives of the milling industry, grain and feed milling industry) are opposite. From the position of society it is important to ensure a balance between the interests of producers and consumers, stability of prices by years. Competent study of institutes of stabilization of agro-food market allows to smooth out the specified contradictions, to reduce, or even to eliminate volatility of the prices.

The experience of the US and EU countries shows that the system of institutions and institutional mechanisms for stabilizing the price situation in the grain market includes four interrelated institutional subsystems: 1) the institutions of commodity-procurement interventions and the mechanisms for their implementation; 2) institutes and institutional mechanisms of price regulation;

3) institutions for storing an intervention fund, 4) a system for monitoring the situation in the agro-food market.

3   Results and Discussion

Institutional mechanisms of stabilization interventions and price regulation in the grain market. Commodity-purchase interventions are an institutional mechanism of state regulation aimed at selling or purchasing agricultural products from the state in order to stabilize the agro-food situation and reduce the volatility of prices and incomes of agricultural producers. The use of commodity-purchasing interventions leads to the formation of two food markets: the free market trade sector and the sector where the prices and the volume of food sales are determined by the Government.

Intervention measures are government intervention in the formation and functioning of the grain market through the use of institutional mechanisms that regulate supply and demand. In the harvest year demand from the population and enterprises for grain is less than its supply. Because of the excess of grain, market prices are falling. The state in this situation can increase the demand for grain due to procurement interventions in the grain market. With the rapid implementation of this measure, with sufficient allocation of budgetary funds for the purchase of grain, the aggregate demand for grain will increase, market prices will rise.

In lean years the supply will be less than demand. Due to the lack of grain, market prices will rise, demand will fall to the level of supply. In such a situation, the state takes measures to increase the supply of grain on the market through commodity interventions from "buffer stocks" made in high-yielding years. As a result, market prices will drop.

Thus, the institutional mechanism of market stabilization makes it possible to mitigate or extinguish the amplitude of fluctuations in prices and incomes of grain producers and to stabilize them by years. This is especially important, because in the grain market, the deviation of prices from the average annual equilibrium level is much more significant than in the markets of many other goods, which is due to the action, as noted above, of King's law.

Stabilization interventions in the grain market can be carried out by the state except for the specified commodity and procurement interventions, based on the use of the institutional mechanism of collateral interventions, which were actively used in the United States. This mechanism of intervention is called the mechanism of collateral prices or the mechanism of state-supported prices.

In autumn, after harvesting, the state issues loans to agricultural producers on security of received products at security rates (at the market price or slightly

higher). In the spring, agricultural commodity producers repay the loan: with a pledged product or a cash amount from the sale of products (depending on the prevailing price situation on the market).

The basis for the operation of institutional mechanisms of stabilization interventions is the correct definition of threshold price values (minimum and maximum prices in the market) at which interventions begin.

Using the institutional mechanism of price regulation allows to extinguish the seasonal price volatility, which raises the profitability of agricultural producers. This aligns not only prices and revenues, but also maintains a higher and predictable price level.

The implementation of commodity-procurement interventions is preceded by a monitoring system. It is a comprehensive methodology for assessing the need for stabilization measures. To timely and efficiently conduct commodity-procurement interventions, it is necessary to develop and justify the threshold criteria for their implementation, to accurately monitor and analyze the dynamics of market conditions, to collect a database for enlarged territories and for the whole of the Russian Federation for a wide range of indispensable indicators.

Up-to-date information on the price situation in the grain market, the formed intervention stocks, the costs of their formation, budget constraints serve as a basis for determining the content and direction of institutional arrangements and the extent of stabilization operations. An outstripping rise in food prices compared to the maximum price level (exceeding the social price limit) signals the need for commodity interventions. The increasing decline in prices in the market, and the approach of market prices to the minimum, signals the need for procurement interventions.

Modeling of stabilization interventions depending on changes in the price situation. The market equilibrium point (P_0Q_0) in the free trade sector varies according to the law determined by the demand function (D) and the offer (S). The overall course and the results of the stabilization operations are shown in Figure 1.

Fig. 1. Change in the market situation in the grain market due to intervention:
a) commodity, b) procurement intervention (compiled by the author), where:

D and S - aggregate demand and supply in the grain market; D_1 - aggregate demand for grain after the procurement intervention; S_1 - aggregate supply in the grain market after the commodity intervention; P_0 and Q_0 - equilibrium indicators of prices and volumes of grain sales on the market before intervention; P_1 and Q_1 - after the intervention; P_{max} and P_{min} - the maximum and minimum limit of grain prices set by the state.

The establishment of market prices (P_0) at a level exceeding the social limit of the retail price in the market (P_{max}) is a signal for carrying out commodity interventions in the grain market (Figure 1a): selling additional lots of food from intervention funds at prices slightly below the maximum limit of the retail price (P_{max}). The stabilization operation results in a shift in the aggregate supply curve from S to S_1. The general market situation after commodity interventions is characterized by an increase in the volume of sales of marketable grain ($Q_1 > Q_0$), due to the sale of grain from the state intervention fund at lower market equilibrium prices, which leads to the formation of a new market equilibrium point that satisfies the initial understanding of price boundaries ($P_1 < P_0$; $P_{min} < P_1 < P_{max}$).

The establishment of market prices (P_0) at a level below the level of profitability of grain farms (P_{min}) is a signal for carrying out procurement interventions in the grain market (Figure 1b): purchases of additional quantities of food on the free market in intervention funds at prices slightly above the minimum limit (P_{min}). Stabilization operation leads to a shift in the aggregate demand curve from D to D_1. The general situation on the market, after carrying out procurement interventions, leads to the formation of additional demand in the market ($Q_1 > Q_0$) and an increase in market equilibrium prices ($P_1 > P_0$; $P_{min} < P_1 < P_{max}$).

The model presented is based on the construction of an "ideal" institute for stabilizing the price situation in the agro-food market. The construction of such

an interconnected system of institutional mechanisms within the framework of a single institution allows:

- To smooth the volatility of price fluctuations by years and by seasons during the year, which leads to a sustainable income generation by agricultural producers;
- reduce the dependence of the development of the industry on the natural and climatic conditions due to the formation of interventional reserves and their consumption in lean years;
- Reduce the negative manifestations of market institutions in agriculture due to the competent construction of complementary institutions of state regulation;
- Smooth out the shock peaks of the agro-food situation to increase the forecast horizons for the development of the industry. The possibility of medium- and long-term forecasting of the agro-food situation allows increasing the inflow of investments into the industry.

Institute for Stabilization of the Price Conditions of the Grain Market in Russia. The dynamics of prices in the grain market of Russia is characterized by their instability over the years, high level of variability (Figure 2). Non-price factors, dynamics of the domestic and world agro-food market cause fluctuations in demand and supply on the Russian grain market. Changes in demand and supply cause changes in the points of market equilibrium and market equilibrium prices. So, for example, for the last seven years explosive price rise occurred three times (in 2011, 2013, 2015). The volatility of prices on the Russian grain market has expanded to price shocks under the influence of both internal and external factors of the conjuncture of the agro-food market. The divergent amplitude of price fluctuations was to be extinguished by means of institutions for stabilizing the price conjuncture.

Fig. 2. Average prices of cereals sold by agricultural organizations, rubles. (¹)

Fig. 3. Dynamics of purchasing ■ and commodity [] interventions of grain crops in Russia, kt (²)

The dynamics of prices on the Russian grain market is characterized by an increase in price volatility. So the price shocks of 2004 and 2008 years. Formed for 20-24 months, and a rise in prices in 2013 and 2015. occurred already in 15 months. The fluctuations in grain producer price indices (the difference between the maximum and minimum price indices by December of last year) increased: in 2015 they amounted to 16.4 pp. against 6.4 percentage points in 2014 (⁶², p. 50). Despite the fact that explosive price increases in these years are increasing, the volume of government purchases in the course of stabilization interventions is decreasing. They amounted to 8 million tons in the 2008/2009 marketing year, 1.8 million tons in 2010/2011, and 0.8 million tons in 2014-2015 (Figure 3).

Such a reduction in stabilization operations on an increasingly volatile market poses a threat to the stable development of the grain economy, the sustainable income generation by agricultural producers and the predictability of the investment climate in the industry.

The formation of procurement interventions in recent years raises questions about the effectiveness of the institutions (rules) for which they are implemented. In the period from February to September 2014 the state did not make any stabilization operations in the market (Figure 4). However, the conjuncture of the agro-food market during this period managed to go through several stages: growth until June and a seasonal summer decline. Only with the achievement of the lowest point of 6000 rubles per ton (below the cost of production), the state began stabilization measures. Measures to purchase food in the intervention

⁶² National report "On the progress and results of the implementation in 2015 of the state program for the development of agriculture and regulation of markets for agricultural products, raw materials and food for 2013-2020." - Moscow: FGBNU Rosinformagrotekh. - 2016. - 257 p.

funds contributed to an increase in grain prices by 1.5 times by March 2015. The dampening nature of grain purchases during this period is generally justified. Further seasonal price decline by August (by 15%) began to be compensated for by purchases only in the fall of 2015. The increase in procurement interventions contributed to a rise in grain prices to 9500 rubles per ton (March 2016).

Figure 4 **Dynamics of procurement interventions (pr scale, kt) and average prices for cereals (left scale, rub./t)** [63]

However, the existing institution of stabilization of the price situation of the grain market in Russia does not cope with the task of ensuring the income of agricultural producers. In Figure 4 in gray color the areas of the cost price of the realized grain crops in Krasnodar territory are marked. In 2014, this is the area of 6500-7000 rubles per ton, in 2015 - 7900-10900 rubles per ton. Folding market prices are indicated by the corresponding curve on the chart. In the season of 2014, producers had the opportunity to profit from sales in the free trade sector. However, as early as 2015, grain prices are entirely in the area of production costs, which makes it possible to speak of the loss-making of most grain-producing farms during this period. At the same time, we consider the production activity of farms from the region with favorable conditions for large-scale grain production.

Studies show that as a result of interventions in the period from 2007 to 2014, producers received an additional income of only 1.2 billion rubles., Consumers cut their spending by 3.7 billion rubles, while net receipts to the budget amounted

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[63]   Statistical data of a single interdepartmental information and statistical system. [Electronic resource]. Access mode: www.fedstat.ru.
Statistical data of the National Commodity Exchange. [Electronic resource]. Access mode: http://www.namex.org/ru/investment/Zakupki2015.
Ministry of Agriculture. Intervention in the market of grain and dairy products. [Electronic resource]. Access mode: http://www.mcx.ru/documents/document/show/25114.htm.

to **minus 25.4 billion rubles**. (Uzun, 2016). The economic results of interventions in Russia show all the inefficiency of the current system of institutions for stabilizing the price situation in Russia. The complexity of the situation is recognized in the Government. So the director of the profile department of the Ministry of Agriculture recognizes that the country has not created a civilized system for trade in procurement and commodity interventions (the granaries of Russia, 2017, p. 45).

The impossibility of the Ministry of Agriculture to develop a system for the full regulation of the agro-food market is explained by the lack of an information and methodological base for conducting interventional operations and gaps in legislation. Such analytical work for today is not within the competence of the Ministry of Agriculture: the ministry determines the size and conducts stabilization measures, however, specific mechanisms for implementing such functions are not prescribed anywhere. All this leads to the fact that in March ([64]) each year the Ministry determines the minimum interventional prices for cereals and carries out interventions during small lots during the year ([65]).

The system of selection of grain storage elevators is also of low efficiency. Comparison of the levels of storage costs for grain in the intervention fund and in the state material reserve showed that the cost of storing 1 ton of grain in the structures of the Rosrezerv (agency for the creation of mobilization reserves required in the event of anthropogenic accidents, natural disasters or humanitarian aid) by 13-52% lower than in the structures of the Ministry of Agriculture. This is explained by the difference in the criteria for selecting granaries and the formation of a tariff for the services provided.

4   Conclusion

Proposals for the improvement of stabilization institutions. Despite the fact that the very fact of the state's appeal to the institution of stabilizing the price situation is positive, the specific conditions for the implementation of formal rules in Russian reality are far from perfect. Economic and mathematical modeling of the Russian grain market (Svetlov, 2016) shows that even the practice of establishing a broad price corridor under the prescribed model of the institute allows, at low

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[64]   Ministry of Agriculture. Order of the Ministry of Agriculture of Russia of March 31, 2015, No. 119 "On the determination of the marginal levels of the minimum prices for grain crops of 2015, when conducting government procurement interventions in 2015-2016." Access mode: http://www.mcx.ru/documents/file_document/v7_show/32152..htm.

[65]   Ministry of Agriculture. On the progress of public procurement interventions of grain crops in 2015 in 2015-2016 agricultural year. Access mode: http://www.mcx.ru/documents/document/v7_show/33529..htm.

budgetary costs, to strengthen incentives for innovation and investment and reduce the volatility of prices and incomes of agricultural producers.

In order to stabilize prices and incomes of Russian agricultural producers it is necessary to implement the following measures to adjust the institution of price stabilization in Russia:

1. To form a clear model of the institute for stabilizing the price situation in Russia. Include in the institute all components: a monitoring system; institutional mechanisms for conducting commodity-procurement interventions, price regulation, storage of the intervention fund. Specify specific rules for implementing the policy as a whole for the Russian Federation, for each region or larger territorial entities by a government decree and methodological instructions of the Ministry of Agriculture.

2. Correct the rules of the institutional mechanism of commodity-procurement interventions:
   - determine the maximum amount of the intervention fund, the maximum volume of stabilization operations at minimum prices, the maximum sales at the maximum prices during the marketing year;
   - describe the rules for conducting commodity and procurement interventions in case of finding market prices outside the interval $[P_{min}; P_{max}]$;
   - to realize the pledge mechanism of purchases (establish the level of collateral prices, the level of storage costs, the mechanism for the return of grain to agricultural producers, the mechanism of post payment under the commodity loan);
   - to pursue a policy of point-by-point implementation of stabilization operations in the territories and seasons of the year in accordance with a differentiated approach to determining the prices of procurement interventions for individual large territories.

3. Correct the rules of the institutional mechanism of price regulation:
   - to develop a methodology for determining price thresholds in specific food markets, to prescribe a specific methodology for their determination. In the case of a minimum price threshold, it is necessary to develop an information and statistical system for determining the cost of production of food in each region and to determine the minimum price at a level ensuring extended reproduction of agricultural producers. In the case of the maximum price threshold, it is necessary to formulate a policy in the field of providing socially acceptable prices or protecting the domestic market.

–   to establish clear terms for the effect of minimum and maximum prices. Determine that their adjustment is possible only in exceptional cases (significant changes in the world market, natural disasters).

4. Correct the rules of the institutional mechanism for the storage of the intervention fund:

    –   to coordinate the actions of the Ministry of Agriculture and Rosrezerv in the field of procurement to the state's intervention funds;

    –   to change the system of formation of a fee for storage of grain during interventions on the basis of the positive experience of Rosrezerv: the formation of tariffs for each specific elevator and 10% of the rate of return;

    –   to conduct a grant development (development work) to find modern technological solutions that allow increasing the efficiency of grain storage taking into account their climate location.

5. Reduce transaction costs of agricultural producers:

    –   prescribe the conditions for introducing non-market restrictions on the grain market: under what conditions is it possible to introduce an export duty, when and how can a ban on the export of grain outside the country be introduced;

    –   reduce the bureaucratic burden on participating in exchange trades (for 2016: contract for the organization of trades - 16 documents, bidding - 13 more documents);

    –   establish responsibility of the Ministry of Agriculture of the Russian Federation, the state agent for interventions (JSC UGK) for the retention of grain prices within the price range;

    –   Develop a system for monitoring and forecasting the situation on the grain market in the subjects of the Russian Federation with simultaneous information to agricultural producers on the following changes in market conditions: the volume of production, use, transportation of certain types of products; emerging prices in the free food market.

Construction of a theoretical model and comparison of theory with practice allow us to say that the institute for stabilizing the price conjuncture shows its effectiveness in reducing the volatility of prices and incomes of agricultural producers in a clearly defined model, which leads to the possibility of sustainable economic growth in the industry. Claims from manufacturers that it is necessary to primarily support exports, rather than interventions, should be cushioned by the development of other institutions of state regulation (change of forms of support, improvement of the quality of stabilization operations). Claims from consumers in relation to price increases in certain years should be mitigated by the

development of demand-side management systems (taking measures to increase demand from low-income citizens, expanding demand for domestic food from budget organizations).

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THE IMPORTANCE OF START-UPS IN THE PROCESS OF TECHNOLOGICAL CONVERGENCE IN THE VISEGRAD GROUP COUNTRIES

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Abstract

Countries of Central and Eastern Europe are facing the challenge of creating an economy based on innovation and knowledge. Eliminating the disproportions in economic development is the key part of the EU's regional policy, and therefore of each member state. The goal of this paper is to analyze technological convergence and to compare startup ecosystems in Poland, Slovakia, the Czech Republic and Hungary. Based on the established goal, three main theses were formulated:

1. *The process of technological convergence in the V4 countries is occurring at a similar rate.*
2. *The largest number of startups in Poland, compared to the countries in the region, is indicative of comparative advantage of this country over other Visegrad Group countries in the high-tech sector.*
3. *Development of startup ecosystems contributes to forcing the pace of technological convergence in the region.*

Keywords: *startup, startup ecosystem, technological convergence, Visegrad Group*

JEL classification: *R11, R58, P25*

1.Introduction

Dynamic development of new technologies and knowledge, not only globally, but also regionally, means that the economic situation of the region is strictly

connected with the development of a knowledge-based economy. One of its parts is the ecosystem of companies, as it creates completely new and innovative products and services, the so-called 'startups'. According to S. Blank, a startup is a temporary institution looking to find a profitable business model. In the initial stage of business development, the entrepreneur bases mainly on assumptions and ideas. They do not have a book of business, and often even face difficulties in conducting market analysis due to the specificity and uniqueness of the product. Startups are usually established in startup ecosystems which are being created by various kinds of institutions of the business environment. These companies, along with organizations that support their development, usually come into existence in large urban centers that have well-developed infrastructure. The example of a startup hub the Silicon Valley became shows that institutions which introduce new products and services have a real impact on the world economic market, contributing to rapid development and popularization of new technologies, and affecting every branch of industry. Development of innovative companies is important also at the country level and is an important part of its economic development. Companies established in the region of Central and Eastern Europe contribute to an increase in competitiveness and innovativeness of the economy, and, by extension, to a reduction in developmental disparities between them and highly-developed countries.

The main purpose of this paper is to analyze the process of technological convergence in the Visegrad Group countries. Based on the formulated goal, the following research theses were put forward:

1. The process of technological convergence in the V4 countries is occurring at a similar rate.
2. The largest number of startups in Poland, compared to the countries in the region, is indicative of comparative advantage of this country over other Visegrad Group countries in the high-tech sector.
3. Development of startup ecosystems contributes to forcing the pace of technological convergence in the region.

Technological convergence was estimated using the revealed comparative advantage index as well as the revealed symmetric comparative advantage index. Based on these indices, type β regression equation was estimated. Statistical data used in this paper came from the European Statistical Office, the Polish Central Statistical Office, and from the reports prepared by institutions dealing with the subject of startups. Countries forming the Visegrad Group (V4) are facing numerous challenges created in the age of high-tech sector development. Structural

similarity between Poland, Slovakia, the Czech Republic and Hungary with respect to developmental is the reason for including them for analysis in this study.

2   Theoretical approach to estimation of technological convergence

Conditions of development of a knowledge-based economy in all countries of the world depend on the level of technological advancement. In order to determine the degree of convergence of the Visegrad Group countries with respect to the analyzed region, the technological convergence (which falls into the trend of economic convergence) was estimated. Technological convergence can be considered in two ways:

1. There is a convergence in technological development of countries;
2. If the studied countries are technologically diversified, then how this situation affects the convergence process or the process of intensification of disproportions among them.

To estimate the convergence taking place in employment in the high-tech sector and in export of commodities of this industry, the B. Balassa revealed comparative advantage index (RCA) was used, according to the following formula:

$$RCA_{ij} = \frac{x_{ij}/\sum x_{ij}}{\sum_j x_{ij}/\sum_i \sum_j x_{ij}} \quad (1)$$

$$x_{ij}/\sum x_{ij}$$

ratio of the export of commodities (employment) of the high-tech sector of country i to total export (employment) in country i;

$$\sum_j x_{ij}/\sum_i \sum_j x_{ij}$$

ratio of the total value of commodities exports in the high-tech sector in all countries of the investigated reference group to the value of total export (employment) in the group of the studied countries.

RCA is an index used in determining comparative advantages between economies. Comparative advantage in a given sector is when a given country has relatively substantial resources in a specific sector of economy and makes use of them in the process of international division of labor. When creating the revealed comparative advantage index, B. Balassa was basing on D. Ricardo's model. He claimed that if the share of export of the analyzed sector of a given country in the total export of that country exceeds the share of the studied sector in the global

export structure, this may be indicative of comparative advantage of products of a country's specific sector compared to a reference group, in other words a set of selected countries (Posłuszny K. 2011). The value of this index is always positive and within the $[0, +\infty]$ range, and, according to Hinloopen and Marrewijk, the magnitude of RCA is interpreted as follows:

- $0 < RCA \leq 1$ – no revealed comparative advantage in the sector;
- $1 < RCA \leq 2$ – weak revealed comparative advantage;
- $2 < RCA \leq 4$ – average revealed comparative advantage;
- $RCA > 4$ – strong comparative advantage of a sector (Salamaga M. 2013).

Another step in the analysis is conversion in order to standardize the RCA index into the revealed symmetric comparative advantage index (RSCA). The conversion was carried out according to the following formula:

$$RSCA = \frac{RCA - 1}{RCA + 1} \quad (2)$$

RSCA value is within the $[-1, 1]$ range, where negative values indicate no revealed comparative advantage of a sector and, analogically, positive values indicate there is comparative advantage of a sector in a country [Głodowska 2016].

The estimated RSCA values were used to create type β regression equation:

$$RSCA_{ij0} = \alpha + \beta RSCA_{ijT} + \varepsilon_{ij} \quad (3)$$

$$RSCA_{ij0}$$

revealed symmetric comparative advantage index in the initial period, estimated for export of high-tech commodities and for employment in the high-tech sector in economy i

$$RSCA_{ijT}$$

revealed symmetric comparative advantage index in the final period for the conducted analysis, estimated for export of high-tech commodities and for employment in the high-tech sector in economy i

$$\varepsilon_{ij} \text{ random component for country}$$

Analysis of technological convergence based on the presented regression equation consists in interpretation of coefficient β, where:

- $\beta > 1$ indicates the divergence process between the studied group of countries with respect to the analyzed variable, resulting from strengthening of a given feature in one country in relation to the reference group;
- $\beta = 1$ is indicative of a constant level of the investigated variable in the analyzed period of time;

■ $0 < \beta < 1$ indicates a convergence process where poorer countries are getting closer to better-developed countries in terms of the level of development of a certain feature (Głodowska A. 2013).

In this case, countries which have been included in the reference group are: Czech Republic, Poland, Slovakia, Hungary. The time period of the analysis covers the years 2010-2015.

3 Analysis of technological convergence in the Visegrad Group countries

Similarity in developmental level and in the condition of economies of individual Central and Eastern Europe countries becomes visible in different spheres of economic life, for example in values of Gross Domestic Product (GDP) per capita, or in the unemployment rate. The table below shows the GDP level per capita in the Czech Republic, Poland, Slovakia and Hungary. All the countries recorded an increase in the analyzed magnitude since 2006. The Czech Republic is ranked best in this comparison, reaching the highest GDP per capita in all the analyzed years. None of the mentioned countries showed a considerable increase in GDP. What is more, the V4 was characterized by a similar trend of appreciation of the variable.

Figure 1 **Gross Domestic Product per capita according to purchasing power parity in the V4 countries (2006-2016)**

Source: Authors' own elaboration based on GUS (Central Statistical Office) database.

Economic growth of regions stimulates the development of new technologies and the increase in significance of countries on the international stage through improvement of innovativeness of economy.

The first step in assessing the convergence process is to estimate the revealed comparative advantage index, developed by B. Balassa.

Figure 2 **Balassa's revealed comparative advantage index in individual V4 countries in export of high-tech sector commodities in the years 2010-2015**

Source: Author's calculations.

RCA values in individual V4 countries show that none of the countries has a revealed comparative advantage in exports of new technology commodities compared to the analyzed reference group. The situation for employment in the high-tech sector is similar, where the revealed comparative advantage index was at a lower level than RCA referring to the export of high-tech products, which also indicates that none of the countries of the region had a revealed comparative advantage.

Figure 3 **Revealed comparative advantage index for employment in the high-tech sector in the Visegrad Group in the years 2010-2015**

Source: Author's calculations.

Based on the estimation of the revealed comparative advantage index and the revealed symmetric comparative advantage index for exports of high-tech

commodities and for employment in this sector, type β regression equation was estimated, and its form is presented in the breakdowns below.

Figure 4 **Predicted values against the observed values. Employment convergence in the high-tech sector in the Visegrad Group in the years 2010-2015**

Source: Author's calculations.

Figure 5 **Predicted values against the observed values. Export convergence of high-tech sector commodities in Poland, Slovakia, the Czech Republic and Hungary in the time series 2010-2015**

$$y = 0{,}2019 + 0{,}952 \cdot x$$
$$r^2 = 0{,}91$$

Source: Author's calculations.

When comparing the share of exports of high-tech commodities in the V4 countries in the years 2010-2015, an increase in value in Poland and Slovakia can be observed (Figure 4). In this respect, Hungary recorded the highest drop, and the Czech Republic recorded slightly lower depreciation. In the sphere of employment in high-tech, the V4 countries have not shown significant changes in recent years (Figure 3). The best situation is in Hungary and the Czech Republic, and the worst in Poland, where the share in employment in new technologies did not reach even 3%.

The Visegrad Groupis characterized by similarity in economic development in relation to global economies. Also in the high-tech sector there is convergence in the development of new technologies or a knowledge-based economy. Value of parameter β within the [0, 1] range in the above-mentioned analyses (β_{export} = 0.95; $\beta_{employment}$ = 0.97) is indicative of the occurrence of technological convergence in the studied reference group. The V4 countries reached similar values of the revealed comparative advantage index, both in the share of exports of new

technology products in the total exports of the countries and in the sphere of employment in high-tech.

4 Comparison of startup ecosystems in the V4 countries

According to data of Startup Poland Foundation, there were 2677 startup enterprises in Poland in 2016. Compared to 2015, an over ten percent increase in the number of startups was recorded. The biggest ecosystem was created around the capital – Warsaw. Moreover, there is an increasing number of enterprises and institutions that affect their development in such cities as: Kraków, Poznań, Wrocław and Trójmiasto. Startup Poland conducted a study in 697 operating enterprises. Almost 60 percent of the respondents estimated the number of full-time positions offered by the company (classifying them, with respect to the number of employees, as micro-enterprise) to be between one and ten. Within the second half of 2016, more than half of startups created, on average, new workplaces for two people. In every fourth enterprise, four to ten people found a job, and about six percent of the respondents employed more than eleven people. In total, more than 80 percent of the respondents increased the number of workplaces. From the employee's perspective, it is negative that almost half the personnel of all startups do not have a permanent employment contract (Skala A. & Kruczkowska E. 2016), which results mainly from the specificity of the industry.

Startup ecosystem in Slovakia is characterized by young age of founders of these enterprises, where more than 80 percent are very well-educated people in the 20-40 age range. The unemployed who cannot find employment in institutions and enterprises operating in the market often decide to open their own business. As beginning entrepreneurs, they can get various kinds of financial aid for the development of their business. In Slovakia, it is Bratislava and Slovak Western Region that appear to create the most favorable conditions for development of startups because of their high percentage in this area. Almost half of the companies did not hire a single employee within a half-year period. On average, two employees were hired in more than 30 percent of startups, 12 percent of the entrepreneurs created workplaces for seven people, and only two percent of the companies hired about 15 new employees. Five percent of the companies created more than 20 full-time positions. Only a quarter of the startup owners did not intend to hire new employees in the next months. Compared to the Polish startup ecosystem, in Slovakia there are definitely more companies (more than 20 percent) that have patents. This may be indicative of a higher degree of innovativeness of products and services. The greatest challenges the authors of breakthrough services and

products face include: entry into a foreign market, the tax issue, complicated regulations, legislation and other administrative burdens. When it comes to company's internal environment, over half of the respondents paid attention to raising capital and to Human Resource (HR), namely the selection of competent personnel without which no business can function properly (Dzurovcinova P. 2016).

In the Czech Republic, a base of 550 startup businesses was created. About one-fifth of the subjects took part in a study whose results were presented in a report published in 2016. More than 60 percent of the respondents regard their products and services as innovative, and every fourth one improves the existing assortment. In most cases, company owners are within the 20-39 age range and they have higher education. Prague appears to be the birthplace for the largest number of Czech startups, where over half of them operate. Almost 65 percent of the respondents hired new employees in the last half year, while most created workplaces for two people, on average. Every third respondent declares the willingness to hire between four and ten employees in the coming months of their business activities, and little more than 18 percent do not intend to expand their personnel. Three and a half percent of the startups plan to make a considerable investment into human capital, forecasting employment of more than 20 people. Seven percent of the companies want to hire between 11 and 20 employees, and over 40 percent – between one and three people (Havlikova D. & Staszkiewicz M. 2016). Compared to Poland or Slovakia, the Czech Republic has the greatest number of patent enterprises, where 35 percent of the companies registered a patent or trademark. Every fourth company only modernizes its product, and in more than 60 percent of the enterprises an entirely new, innovative product or service are created. A remarkably high percentage of respondents talk about informal cooperation with research units or universities in order to obtain new ideas. Bearing in mind the constant lack of agreement between science and business, it is possible that the Czech Republic is slowly reaching a consensus on this issue.

Hungarian database of startups is the biggest collection compared to the other Visegrad Group countries. Information is gathered among 131 companies connected with technological novelties. The latest available data is from 2014. In that period, every second startup was in the early development stage, every third business was legalized, every tenth had already reached economic efficiency. The IT industry, software, and the broadly understood area of social mobility have become the main technologies of the analyzed group of companies. Target groups, to which products and services are addressed, are divided into two areas, namely business and society. As many as 81 percent of the enterprises declare they are going to create new workplaces.

Development of startup ecosystems through creation of successive companies that offer innovative products and services contributes to appreciation of the level of new technologies in national economy. Increase in the number of startups has a beneficial effect on competitiveness and innovativeness of a country. Currently the main challenge for every country in the world is the drive towards development in the high-tech sector, which can be seen also in the principles of the 2020 Strategy, announced and executed by the European Union. The aspirations to increase funds directed into Research and Development (R&D), which are expected to exceed 3% of European GDP, are supposed to result in technological development of the member states. All activities within the European Union relating to the R&D sector as well as development of innovative companies in individual countries contribute to accelerating the process of technological convergence of less developed countries towards stronger countries.

5   Conclusion

Currently, the convergence process is desired in every sector of economy of developing countries. In the era of rapid technological progress, this particularly applies to the high-tech sector, which appears to be developed best in the United States. The region characterized by relative homogeneity in the level of economic development is the Visegrad Group, consisting of Poland, the Czech Republic, Slovakia and Hungary.

After estimation and analysis of the Balassa's revealed comparative advantage index, the revealed symmetric comparative advantage index, and type β regression, the first of the research hypotheses put forth in this paper (saying about a similar level of gradual technological convergence in the Visegrad Group countries) was confirmed. Another thesis turned out to be wrong, which was indicated by the estimated values. Currently, none of the analyzed countries has a comparative advantage either in employment or in the exports of commodities of the high-tech sector. The last assumption referring to the influence of startup ecosystems on the process of technological convergence can be regarded as correct since startups have an indisputable impact on the development of innovativeness and competitiveness, and on the technological progress. Comparison of startup ecosystems in V4 showed Poland's domination with respect to the number of established companies, and domination of the Czech Republic when it comes to the number of obtained patents. Taxes are an important aspect strictly connected with hiring employees. In this extent, the Visegrad Group countries should focus on introduction of the so-called startup tax, which is a great help when it comes to employee remunerations. The future of the economy of the Central and Eastern

Europe countries is based on the development of a knowledge-based economy and on creation of new technologies, and this can be achieved through appreciation of funds directed to research and development as well as to supporting the development of startups, which actually build the competitiveness and innovativeness potential of a country.

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ELDERLY PEOPLE IN LABOR MARKETS IN SELECTED CENTRAL EUROPEAN COUNTRIES

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Abstract

In most European countries, one of the biggest challenges is population ageing due to declining birth rates and a longer life expectancy. The demographic slowdown contributes to the decline of labor resources. That process threatens the public finance and economies of many countries. Increasing the economic activity of elderly people is a way to meet the challenges posed by unfavorable changes in human resources. The purpose of this paper is to present the evolution of economic activity of elderly people in the 2005-2015 period in selected Central European countries: in Poland, Czech Republic, Slovakia, Slovenia and Hungary.Also, an attempt was made to specify the key determinants impacting the economic activity of this sub-population. As shown by the analysis, over the 2005-2015 period, there was a gradual increase in employment rates of the population aged 55-64. Among the countries considered, attention should be drawn to Poland where that rate increased by 18 percentage points. That growth is related to the implemented reform of the pension scheme and to initiatives in place that activate the elderly population.

Keywords: *economic activity, elderly people, Central Europe*

JEL classification: *J10, J14, J21, J26*

1   Introduction

The increase in economic activity of elderly people has become one of the main objectives of the labor market policy. The growing interest in the economic activity of this social group is the consequence of demographic slowdown and of

related modifications in the structure of the population. Population ageing is due to declining birth rates and a longer life expectancy. These problems have become a major challenge faced by many European Union countries. The consequences of the population ageing process have been recognized in early 1990s, and have since become the subject matter of many public debates. The ageing society is considered to threaten the viability of the social insurance, healthcare and public finance systems. Also, it represents a risk for the innovativeness and competitiveness of economies while impacting the financial standing and sense of security of elderly people. What needs to be emphasized is that an active government policy should guarantee the enhancement of security, thus improving the population's quality of life as regards both financial and social aspects. For each human, these dimensions are of crucial importance as "the first one means ensuring essential funds that enable addressing the minimum level of needs (guaranteed incomes) while the other one results from the state's legal system which ensures governance over social relationships and is related to legal procedures launched for individuals facing precarious situations (guaranteed employment or unemployment benefits, sense of security and of a secure future" (Kalinowski, 2014, p. 390-391). This requires seeking the optimum solutions and adjusting the social policies in place, especially the employment, demographic and family policy.

Therefore, an important research problem is to analyze the professional activity of the elderly population, and especially to identify its underlying factors which primarily include demographic, economic and social aspects. The purpose of this paper is to present the evolution of economic activity of elderly people in the 2005-2015 period in selected Central European countries, namely in Poland, Czech Republic, Slovakia, Slovenia and Hungary.Also, an attempt was made to specify the key determinants impacting the economic activity of this sub-population.

2   Data and Methods

Although many definitions of old age are provided in the relevant literature, that term was defined for the purposes of this paper. WHO set 60 as the beginning of old age, and identify its three essential stages: late adulthood (from 60 to 75 years), old age (from 75 to 90 years) and elderhood (from 90 years) (Guttowska, 2015, p. 11-12). However, in line with the "Europe 2020" strategy, this paper assumes that older (elderly) people mean the population aged 55-64 (European Commission, 2010, p. 5).

The situation of elderly people in the labor market was analyzed in Poland, Czech Republic, Slovakia, Slovenia and Hungary.These countries were selected

because of their location, economic and cultural similarities, the time they joined the European Union and their membership in the Visegrád Group.

This publication relies on Eurostat and OECD data. Empirical data was analyzed with measures of descriptive statistics, demographic measures (including the fertility rate, demographic dependency index, life expectancy, potential labor turnover ratio), and indices of the condition of the labor market (including the economic activity rate, employment rate, unemployment rate and EPL).

3   Ageing society of selected Central European countries

The ageing population is a problem caused by extended life expectancy and declining birth rates. Since the 1980s, Europe has been affected by a demographic shift which initially became noticeable in highly developed countries. In Central and Eastern European countries, these processes appeared a little later, in the early 1990s. A shift in the demographic structure adversely affects the age dependency ratio and, as a consequence, the condition of European societies. Demographic processes have become a major problem to be solved. The first challenge faced by European countries is fertility. In Poland, Czech Republic, Slovenia, Slovakia and Hungary, the fertility rate has been decreasing for more than a decade, reaching a level below the replacement threshold. In 2015 and 1970, in European Union countries, the average rate was 1.6 and 2.4 children per woman of child-bearing age, respectively. In 2005, the fertility rate was below the Union average level in all countries covered by this analysis. In turn, in 2015, Hungary, Poland and Slovenia recorded lower levels of 1.4, 1.3, and 1.4, respectively. In Czech Republic and Slovakia, the fertility rate was 1.6 (Figure 1). Note that in the early 1970s, a fertility rate below the replacement threshold was reported only in the Czech Republic whereas in the early 1990s, it was the case for three out of five countries covered by this study, i.e. for Czech Republic, Hungary and Slovakia.

Over the 1970-2015 period, the analyzed Central and Eastern European countries experienced a considerable decline in fertility rates caused by multiple factors, including changes in mentality, decline in the economic security of families and fertility problems resulting from biological reasons which grow with age. Fertility rates are also impacted by many other factors, primarily including education, religion, nationality, place of residence, labor market situation and support for families.

Figure 1 **Total fertility rate in 1970-2015**

Source: Own elaboration based on OECD and Eurostat data.

The average life expectancy continues to rise which "is related to multiple factors, including the improvement of living conditions and the development of health-care services" (Jabłońska-Porzuczek & Łuczka, 2016, p. 91). In 2005 and 2015, an average 65-year old resident of the European Union had 18.3 and 19.7 years of life ahead of him/her, respectively. Note also that there are considerable differences between women and men aged 65 as regards life expectancy. In 2005, a European woman aged 65 had 19.9 years of life ahead of her (21.2 in 2015). For a European man, the respective figures are 16.4 and 17.9. In the Central European countries covered by this study, the longest life expectancy was forecasted for 65-year-old Slovenians (women: 19.3-21.4, men: 15.2-17.6). In turn, the shortest life expectancy was reported in Slovakia (women: 17.1-18.8, men: 13.3-15.0), including an average of 4 years of healthy life (women: 5.8-3.8, men: 4.8-4.1) (Table 1). The longest healthy life of all countries considered was reported in Czech Republic (women: 8.6, men: 8.0).

Table 1 **Life expectancy and healthy life years at age 65 in 2005 and 2015**

	Life expectancy at age 65				Healthy life years at age 65			
	Females		Males		Females		Males	
	2005	2015	2005	2015	2005	2015	2005	2015
EU(28)	19.9	21.2	16.4	17.9	-	9.4	-	9.4
Czech Republic	17.7	19.4	14.4	15.9	7.0	8.6	6.6	8.0
Hungary	17.2	18.2	13.3	14.5	5.0	5.9	5.1	5.9
Poland	18.5	20.1	14.3	15.7	10.2	8.4	8.4	7.6
Slovenia	19.3	21.4	15.2	17.6	8.6	7.6	7.4	8.2

	Life expectancy at age 65				Healthy life years at age 65			
	Females		Males		Females		Males	
	2005	2015	2005	2015	2005	2015	2005	2015
Slovakia	17.1	18.8	13.3	15.0	5.4	3.8	4.8	4.1

Source: Own elaboration based on Eurostat data.

Low fertility rates contribute to the decline in the young people's share in the population, while the extended life expectancy contributes to the increase of the older people's share. One way to determine the progress of demographic ageing is to use the age dependency ratio. In the European Union, it went up from 24.7 in 2005 to 28.8 in 2015 (Figure 2). In the group of countries considered, the lowest proportion of persons aged over 65 per 100 working-age population was recorded in Slovakia, ranging from 16.4 in 2005 to 19.7 in 2015. In turn, the highest growth of that ratio over the 2005-2015 period was reported in Czech Republic (by 6.8) and Slovenia (by 4.8).

Figure 2 **Old-age-dependency ratio in 2005-2015**

Source: Own elaboration based on Eurostat data.

The demographic processes in progress are reflected in changes to labor resources. Potential labor resources decrease because older age groups are not replaced by younger ones who start their professional activity. A measure that enables assessing the replaceability of the pre-retirement population with the new working-age population is the potential labor turnover ratio, defined as the proportion of the population aged 15-24 to the population aged 55-64 (Kowalewski & Majdzińska, 2012, p. 75).

In 2005, the population starting their professional activity outnumbered the population exiting the labor market in the countries covered by this analysis. In 2015, it was the opposite. In the first year surveyed, old labor resources were replaced with new ones, with the highest turnover ratio (1.6) recorded in Poland and Slovakia (Figure 3). In turn, one decade later, the younger generation failed to the replace the older, with the lowest ratio recorded in Slovenia (0.7).

Figure 3 **Potential labor turnover ratio in 2005 and 2015**

Source: Own elaboration based on Eurostat data.

4 Economic activity of the elderly population in selected Central European countries

The demographic slowdown particularly affects the labor market which bears the costs of the ageing society due to unfavorable developments in labor resources. To prevent the decline in labor resources, incentive measures need to be taken to increase the employment of elderly people. Such measures are implemented both by the European Union and by the authorities of member countries. In the area of legislation affecting the situation of elderly people in the labor market, the European Union issues regulations, directives, recommendations and opinions. Community countries, in turn, make decisions on the instruments that contribute to the designated objectives.

An important Union document setting out the recommendations for such areas as the economic activity of the elderly people was the Lisbon Strategy. It specifies objectives regarding employment (including employment quality), labor

productivity and social cohesion to be met by EU countries by 2010. One of the main objectives is to reach an employment rate of 50% among older people (aged 55 to 64) (European Parliament, p. 35). Note that in 2010, only 10 Community countries (including Denmark, Germany, Estonia, Ireland, Cyprus) reached that target. The countries considered in this analysis failed to do so. In this group, in 2010, the highest employment rate of older people (3.5 percentage points below the target level) was recorded in Czech Republic. The Lisbon Strategy has been replaced with a new strategy, "Europe 2020," setting forth five main objectives to be attained by 2020. One of them is to increase the employment rate of the population aged 20 to 64 from 69% to 75%, including through the greater involvement of women and older workers in the work force (European Commission, 2010, p. 8).

From 2005 to 2015, the employment rate of the population aged 55 to 64 went up by 11 percentage points (Table 2). In turn, as regards the countries covered by this analysis, the highest employment rate was recorded in Czech Republic (44.5-55.5%). The highest increase of the employment rate (and, at the same time, the largest drop in the unemployment rate) was reported in Poland and Slovakia. Slovenia, in turn, recorded the highest increase of the unemployment rate (3.6 percentage points) and a slight improvement of the employment rate (5.9 percentage points). Countries who had reported the lowest levels of the aforesaid ratio in the first year of the study period subsequently experienced the highest growth pace. A notable example is Poland where the employment rate grew by 17 percentage points. Over the recent years, Poland has implemented multiple comprehensive solutions to increase the economic and social activity of elderly people, including "*50 PLUS*: an agenda for the employment of people aged over 50" and "Solidarity between the generations. Measures intended to increase the economic activity among people aged 50+." In the initial years of the study period, low employment rates of the older population reached various levels but were considerably impacted by the pension schemes in place. Many countries undertook reforms which included removing early retirement schemes and raising the retirement age. This contributed to extending the economic activity period by 4.2 years in Hungary; by 2 years in Poland; by 1.5 years in Czech Republic; by 1.1 years in Slovakia; and by 0.8 years in Slovenia in the 2005-2015 period (Eurostat, 2018). The retirement age varies across the countries covered by this study. The lowest retirement age was applicable in Czech Republic, Slovenia and Hungary (62-63); at the other end of the scale were Poland and Slovenia (65). In Poland, the decision was made in 2012 to extend the retirement age to 67[66]. However, considering the standard lifecycle model, the statutory retirement age does not necessarily mean retirement.

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[66]   In 2017, the retirement age was reduced (65 for men, 60 for women).

Everyone should choose the optimum time to discontinue his/her economic activity in an effort to maximize his/her utility (Żukowski, 2007). The length of active life affects the amount of pension benefits. Therefore, exiting the labor market at a relatively young age may result in a low pension which means the risk of falling into poverty. In 2015, 16.2% of the European Union population aged 65-74 were at risk of poverty. In the group of countries considered, the highest at-risk-of-poverty rates were recorded in Poland (18.1%), Slovenia (17.7%) and Hungary (17.6%). In Czech Republic and Slovakia, the respective figures were 10.3% and 11.2% (Eurostat, 2018). Old-age pensioners living in poverty often return to the labor market to enter into secondary employment. Note however that, in addition to pension amounts, the level of poverty is also affected by such factors as education and health. Therefore, the government should pursue an active policy to address poverty by promoting economic activity instead of implementing a passive policy and paying social benefits (Kanabar, 2017).

Table 2 **Employment rate and unemployment rate among people aged 55-64**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Employment rate (%)											
EU(28)	42.2	43.3	44.5	45.5	45.9	46.2	47.2	48.7	50.1	51.8	53.3
Czech Republic	44.5	45.2	46.0	47.6	46.8	46.5	47.7	49.3	51.6	54.0	55.5
Hungary	33.0	33.2	32.2	30.9	31.9	33.6	35.3	36.1	37.9	41.7	45.3
Poland	27.2	28.1	29.7	31.6	32.3	34.1	36.9	38.7	40.6	42.5	44.3
Slovenia	30.7	32.6	33.5	32.8	35.6	35.0	31.2	32.9	33.5	35.4	36.6
Slovakia	30.3	33.1	35.6	39.2	39.5	40.5	41.3	43.1	44.0	44.8	47.0
Unemployment rate (%)											
EU(28)	6.4	6.1	5.4	5.11	6.2	6.7	6.8	7.3	7.7	7.4	7.0
Czech Republic	5.2	5.3	4.6	3.9	5.7	6.5	5.8	5.8	5.8	4.9	4.4
Hungary	3.9	4.0	4.4	5.1	6.5	7.9	9.2	8.4	8.1	6.4	5.8
Poland	10.8	8.5	6.8	5.3	6.3	7.1	6.9	7.4	7.7	6.8	5.4
Slovenia	4.2	2.5	3.3	4.0	3.6	4.0	6.3	6.2	7.0	7.8	7.8
Slovakia	13.4	9.8	8.2	6.4	7.7	10.1	10.1	11.2	11.0	10.6	9.3

Source: Own elaboration based on Eurostat data.

The unemployment rate of elderly people continues to be relatively high. In turn,

a low share of population aged 55-64 have embraced lifelong learning. Note how-ever that the share of older people attending trainings is gradually increasing. In 2015, the highest shares of older people participating in learning courses were re-ported in Slovenia (4%) and Czech Republic (3.7%). Conversely, the lowest shares were observed in Poland (0.8%) and Slovakia (0.9%). In the study period, the highest growth of the share of people aged 55-64 embracing lifelong learning was recorded in Hungary (from 0.3% to 3.1%) (Eurostat, 2018). Professional activity is changing because of new technologies and globalization challenges. These chang-es require a combination of knowledge, skills and qualifications which could not have been acquired by the elderly population at earlier life stages. This is why they should access a state-of-the-art education and competence enhancement system.

An important instrument stimulating the economic activity of older people is flexible employment. Flexibility of employment is reflected by the ability to use unconventional forms of employment, e.g. part-time jobs or contracts entered into for a definite period. In the European Union, from 2005 to 2015, the aver-age share of the elderly population employed under a fixed-term contract was 6.5%. In the group covered by this analysis, that share varied from one country to another. Fixed-term contracts enjoyed the highest popularity in Poland (16% in 2005, 16.6% in 2015). In turn, in Czech Republic and Slovakia, the share of the population employed under a fixed-term contract went down by 5.8 and 2.6 per-centage points, respectively. In Hungary, fixed-term contracts have become an increasingly popular form of employment. Consequently, the share of older em-ployees under a fixed-term contract increased from 4.8% to 10.8%. The use of fixed-term contracts depends on legal regulations applicable in the country con-cerned. Older people are also interested, though to a small extent, in part-time jobs. In European Union countries, the share of older persons employed under a part-time contract increased from 21.7% in 2005 to 22.1% in 2015. In turn, as regards the countries covered by this study, part-time employment had a low and declining share. Over the 2005-2015 period, the share of older people employed under a part-time contract decreased from 22% to 10.4% in Poland; from 8.3% to 7.6% in Czech Republic; and from 14.9% to 13.4% in Slovenia. A slight increase in the popularity of this form of employment among elderly people was recorded in Hungary (from 9.9% to 10.3%) and Slovakia (from 6.8% to 7.3%) (Eurostat, 2018). Flexibility of employment is affected by legal protection measures which may be assessed based on the EPL (Employment Protection Legislation) index, also used as an indicator of the degree of labor market regulation. In 2005-2013[67], the countries under consideration saw a decline in their EPLs. As regards EPL for

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[67] No data from 2014-2015 is available.

individual and collective dismissals, the highest drop was reported in Hungary (from 2.0 to 1.59) and in Czech Republic (from 3.31 to 2.92). In turn, three out of five countries covered by this study recorded an increase in EPL for fixed-term contracts: from 1.13 to 1.44 in Czech Republic, from 1.13 to 1.25 in Hungary, and from 0.63 to 1.75 in Slovakia. Poland is the region's only country with a stable level of EPLs for individual and collective dismissals and for fixed-term contracts; note that the EPL for collective dismissals was relatively high (2.88) (OECD, 2018). As shown by data analysis, Central European countries demonstrated the highest level of protection for collective dismissals and the lowest level of protection for fixed-term contracts.

The situation of elderly people in the labor market tends to improve. However, their potential remains underexploited as regards their participation in economic and social life. The level of underexploited potential of the older population may be estimated with the Active Ageing Index developed as a combination of measures from four domains: employment, participation in society, independent living, capacity for active ageing (United Nations Economic Commission for Europe, 2015, p. 12). In 2014, in the European Union, activity levels of older people varied from one country to another. Scandinavian countries (Sweden: 44.9%, Denmark: 40.3%) ranked at the top while the Central European countries covered by this study were at the bottom. Czech Republic (34.4%) was ranked 11th; Poland (28,1%) was ranked 27th (at the penultimate place), outperformed by Hungary (28.3%), Slovakia (28.5%) and Slovenia (29.8%) (Figure 4).

Note the relatively large gap between Sweden and the countries of the region considered, ranging from 10 to 17 percentage points. This results from high employment levels of elderly people and from the active ageing capacity of the Swedish population. Compared to Scandinavian countries, the group of Central European countries covered by this study were characterized by low employment levels of older people and by a poor participation of the elderly population in lifelong learning and social life. Generally, Swedish people live longer and healthier lives. In 2015, life expectancy for a 65-year-old woman and man was 16.8 and 15.7, respectively. This results from better healthcare and more extensive health education.

Figure 4 **Active Ageing Index in 2014**

Source: Own elaboration based on the United Nations Economic Commission for Europe. (2015). Active Ageing Index 2014. Analytical Report, p. 21.

In some countries, health promotion is limited to the activity of carers, sometimes supported by the efforts of nurses and social workers. Healthcare and education are an important activity area of the local community, NGOs and universities of the third age. The countries considered take various measures as a part of health education. "Supporting addicted residents in social assistance homes for improving therapy and rehabilitation" is a Polish campaign dedicated to older people. Czech authorities have established a program named "Effect of dance therapy on health status and quality of life of residents in care homes" which provides information and offers training on how to avoid health-risk behaviors (e.g. excessive alcohol consumption, addition to drugs, solving sleep problems). Also, as a part of promoting mental health and cognitive abilities, Poland runs the "Stop Alzheimer's" program targeted both at older people and their carers. Other programs in place are "Memory Clinic" and "EUNESE: European Network for Safety Among Elderly" which include vaccination, hearing and vision tests, oral hygiene and recognition of diseases such as dementia. Czech Republic implements the "Delicious Life" program which promotes healthy nutrition and physical activity of the elderly (Sowa-Kofta & Szetela & Golinowska, 2017).

5   Conclusion

Demographic changes, new technologies and globalization are among the major challenges faced by today's labor market. Several conclusions may be drawn from

the analysis of situation of elderly people in labor markets in selected Central European countries. First, the data suggests a demographic slowdown accompanied by changes in the age structure, as reflected by increasing age dependency ratios. Secondly, the countries covered by this analysis demonstrate a decline in potential labor resources because older employees are not replaced by younger ones who start their economic activity, as evidenced by the increasing potential labor turnover ratio. Thirdly, the 2005-2015 period witnessed a gradual growth of employment indices of the elderly population. However, this figures are still relatively low compared to other Community countries (e.g. the Netherlands: 61.7 in 2015).

For several years, the countries considered have taken measures to increase the economic activity of the elderly. Pension reforms, labor market reforms and various programs and strategies have been implemented. Nevertheless, the unemployment rate in the group aged 55-64 is relatively high while the participation of that population in lifelong learning is low. This is of major importance because elderly people are usually less educated than younger people, and find it more difficult to adjust to the evolving needs of the labor market. Another important aspect is the attitude of employers who are reluctant to employ older people. Also, discrimination on the grounds of age continues to be a major issue. Therefore, many countries have implemented solutions encouraging the employers to hire older employees. What becomes important is to recognize the role of capital, skills, and professional and life experience of the elderly. Note that leveraging the professional potential of elderly people is a way to meet the challenge posed by declining labor resources. This requires a coordinated labor market policy which adjusts the measures to the ageing labor resources. Measures would need to be taken to encourage older employees to improve their qualifications and skills through lifelong learning. Another important aspect are the flexible forms of employment which become increasingly popular among older people as they enable combining work with social and family activities.

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RELATIONSHIP BETWEEN PRICES ON INDIVIDUAL LEVELS OF MILK FOOD VERTICAL

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Abstract

The aim of the paper is to find out the relationship between milk prices on individual levels of its food vertical in Slovak republic, i.e. as milk price on one level of milk food vertical influences the price on the other level of the same vertical. Logarithmic regression analyses with corrected heteroscedasticity and autocorrelation is used to observe the relationship between prices of milk on its individual vertical levels. All estimated logistic regression models were statistically highly significant and all possible variations of primary milk production prices, milk processor prices and retail prices were provided. In case one of the variables was not statistically significant, new observation without not significant independent variable was conducted. Except of one observation with unit elasticity, all other observations revealed inelasticity in elasticity of price transmission between individual milk food vertical prices. This fact indicates that prices at individual levels of the milk food vertical are not distributed proportionally and the price change on one vertical level is not fully reflected on to other lever of milk food vertical.

Key words: *milk, milk price, food vertical, regression analyses, elasticity of price transmission*

JEL classification: *A1, A10 l, C01*

1   Introduction

Even though continuous decrease in dairy cow's number is Slovak republic still self-sufficient in milk production. This self-sufficiency was provided by continuous increase in milk yield.

The consumption of milk varies during the period 2010-2016 between 44.4 and 52.3 liters on inhabitant. Because of milk crises in 2017 accompanied by milk price decrease, the milk and milk products consumption increased by almost 10 kilograms in comparison to 2016. The world demand for milk has increased dramatically during the last decade. Consumption has particularly increased in eastern, middle eastern Asia and in Africa. Thiele et. al. (2013) forecasted the increasing milk world consumption with an average growth of 12 million tons per annum until 2022, implying that demand will grow from today's 630 million tons to about 750 million tons. At present, liquid milk reached maturity. The UHT technology has been, due to the logistic limitations overcome, the great contribution to the expansion of the milk market (Mambriani, D. & Gonano, S. 1996). Consumption of milk and dairy products has been increasing on a global level as a reason of both a growing population and increases in per capita consumption. It is generally recognized that economic factors such as higher consumer income and declining retail prices for milk and dairy products over the recent decades, relative to other foods, have caused most of this increase in per capita consumption. While global food demand increases with income, the total share of household's budget spent on food generally falls as income rise. Although the proportion of a household's budget spent on food decreses with income, wealthier countries tend to be less responsive to changes in food prices (Agra CEAS Consulting 2004).

In connection with the analysis of the agrifood chains and their partial markets, the economists dealing with this field of study often focus on the research of the intermarket price transmission (Revoredo et. al. 2004). It is possible, at least to some extent, according to the magnitude of the price transmission elasticity to assess the market structure performed within the given commodity chain, respectively its partial markets (Mc Corriston, S. 2002).

The assessment of price change along the supply chain, consequently how fast and to what extent price changes are transmitted between different levels of food vertical, is often used as an indicator of the efficiency and effectiveness of the chain as well as the assessment of the level of competition in the production and distribution (Vavra, P. A. & Goodwin, B. K. 2005).

1.1 Vertical food chain and the share of agricultural producers on retail price

The food vertical characterizes the production, processing and marketing processes, their interactions on individual markets that operate within the scope of this definition respectively global network. Vertical in this sense are generally discharged from the initial production of agricultural products (commodity or aggregation of the same commodities) as raw materials. Verticals are observing the flows from producer to consumer. In traditional model, which is characterized by supply side preferences, the flow of the product from production to final processing, the decisive position within the chain was concentrated in the production phase of agricultural products, i.e. at the level of primary agricultural production. Other related articles are understood primarily as processing agents for all agricultural production into final food without decisive influence on the size and parameters of the supplied raw material (Bečvářová, V. 2011).

Agricultural economists are often dealing with the questions of price creation, starting with manufacturers and ending with end-seller. The policy makers are interested in the consequences of the specific policy or economic changes. The ratio of agricultural producers on retail price is in generally a simple share of the farmers price and retail price. Obviously, the higher the number of this share is, the higher share of the retail price gets the farmer. With increasing number of elements in the food chain vertical (processing, storage, transportation, advertising, etc.), this share decreases. The final value (price) of the product is distributed between other elements on the market (Hudson, D. 2007)

2 Data and methodology

We used the Eurostat data of milk price on individual levels of milk food vertical from primary milk producers true milk processors to consumer or retail price. Original data in Euro for one kilogram of milk were converted on Euro for one liter of milk. Coefficient 1.03kg equals to 1 liter of milk was used (Ministry of Agriculture and Rural Development of the Slovak republic, 2002).

Under regression we understand study of the relationship between two or more variables using statistical model, which is characterizing the dependency between the selected variables. Using regression model expresses the regression analyses the quantitative influence of separate explanatory (independent) variables on the explained (dependent) variable. The linear regression model explains the relationship between dependent variable Y and k number of independent variables X_j (j = 1, 2, …, k). It has a general form:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + ... + \beta_k x_{ik} + e_i,$$

The absolute member – coefficient β_0 is called *intercept*. It is interpreted as a conditional mean value variable Y assuming that all explanatory variables take the value zero.

Coefficients X_j (j = 1, 2, …, k) are called *regression coefficients*. Regression coefficient β_j shows how the mean value of the dependent variable Y changes, if the independent variable X_j changes by one unit and the other variables stays unchanged (Šoltéz, E. 2008).

All regression analyses were conducted using regression model. All the data were logarithm. Multicollinearity wasn`t proved in any model. Heteroscedasticity and autocorrelation problem was removed using heteroskedasticity autocorrelated consistent (HAC). Due to the use of logarithmical data in regression models, all the regression coefficients present elasticity of price transmission. The time shift in price transmission wasn't an object of the observations.

3   Results and discussion

The regression equation in the first model was compiled using three variables. The dependent variable y represents milk prices at primary producers. For the time series data, the prices of Q quality milk in Euro per one liter for individual levels of milk food vertical were selected. Selected dependent variables are x_1 – milk processor's prices and x_2 – retail prices.

Model 1: OLS, using observations 2010:01-2016:12 (T = 84)
Dependent variable: l_Production
HAC standard errors, bandwidth 3 (Bartlett kernel)

	Coefficient	Std. Error	t-ratio	p-value	
const	−0,853489	0,0687910	−12,41	<0,0001	***
l_Processing	0,334706	0,109169	3,066	0,0029	***
l_Retail	0,628753	0,117533	5,350	<0,0001	***

Mean dependent var	−1,179823		S.D. dependent var	0,081650
Sum squared resid	0,129060		S.E. of regression	0,039917
R-squared	0,766758		Adjusted R-squared	0,760999
F(2, 81)	28,67288		P-value(F)	3,84e-10
Log-likelihood	152,8974		Akaike criterion	−299,7948

Schwarz criterion	−292,5024		Hannan-Quinn	−296,8633
rho	0,868560		Durbin-Watson	0,266890

The estimated regression function has the form:

$$y = -0{,}8535 + 0{,}3347x_1 + 0{,}6288x_2$$

This model was statistically significant and explained 76,68% of changes in the milk producer's prices. The elasticity of the price transmission for the independent variable x_1 – milk processor's prices can be interpreted as follows: an increase in prices of milk processing units by 1% may cause a non-elastic increase of primary milk producer's prices by 0,33% on average. The regression coefficient is statistically significant. The second regression coefficient denotes that an 1% increase in retail prices of milk could cause an increase in primary producer's prices by 0,63% on average. This regression coefficient was also statistically significant.

The regression equation of Model 2 is compiled as follows. Prices at processing level as the dependent variable y. The independent variable x_1 are prices of milk producers and x_2 retail prices.

Model 2: OLS, using observations 2010:01-2016:12 (T = 84)
Dependent variable: l_Processing
HAC standard errors, bandwidth 3 (Bartlett kernel)

	Coefficient	Std. Error	t-ratio	p-value	
Const	0,453516	0,238147	1,904	0,0604	*
l_Production	1,00370	0,229714	4,369	<0,0001	***
l_Retail	−0,230407	0,318429	−0,7236	0,4714	

Mean dependent var	−0,696511		S.D. dependent var	0,096455
Sum squared resid	0,387019		S.E. of regression	0,069123
R-squared	0,498805		Adjusted R-squared	0,486430
F(2, 81)	16,67351		P-value(F)	8,62e-07
Log-likelihood	106,7733		Akaike criterion	−207,5467
Schwarz criterion	−200,2542		Hannan-Quinn	−204,6152
rho	0,846733		Durbin-Watson	0,311870

We estimated the regression equation in following form:

$$y = 0{,}4535 + 1{,}0037x_1 - 0{,}2304x_2$$

The estimated model explains 49.88% of the dependent variable changes and it is statistically highly significant. Almost unit-elasticity was estimated between dependent variable y (processing prices) and the independent variable x_1 (production prices). An increase of the producer's prices could cause nearly the same increase in processor's prices in average. High statistical significance was revealed by this regression coefficient. Retail prices regression coefficient wasn't statistically significant and was removed from following model.

Model 3 was estimated using one independent variable. It explains 48.62% of the dependent variable (processor's prices) changes and is statistically highly significant. As already mentioned the relationship observation for retail prices was removed. The only one independent variable x_1 are primary producer's prices.

Model 3: OLS, using observations 2010:01-2016:12 (T = 84)
Dependent variable: l_Processing
HAC standard errors, bandwidth 3 (Bartlett kernel)

	Coefficient	Std. Error	t-ratio	p-value	
Const	0,275370	0,199228	1,382	0,1707	
l_Production	0,823752	0,174504	4,721	<0,0001	***

Mean dependent var	−0,696511	S.D. dependent var	0,096455
Sum squared resid	0,396719	S.E. of regression	0,069556
R-squared	0,486244	Adjusted R-squared	0,479978
F(1, 82)	22,28359	P-value(F)	9,57e-06
Log-likelihood	105,7336	Akaike criterion	−207,4673
Schwarz criterion	−202,6056	Hannan-Quinn	−205,5129
Rho	0,854420	Durbin-Watson	0,295622

The simple regression equation has a form:

$$y = 0{,}2754 + 0{,}8238x_1$$

A possible increase by 1% in milk producer's prices may cause an increase in the processing prices by 0.82% on average. The price transmission in the model is inelastic. The regression coefficient is statistically significant.

The retail prices are the dependent variable y in model 4. For the independent variables were selected - x_1 milk producer's prices and x_2 – processor's prices of milk. The model is statistically significant and explains 65.74% changes of the milk retail prices.

Model 4: OLS, using observations 2010:01-2016:12 (T = 84)
Dependent variable: l_Retail
HAC standard errors, bandwidth 3 (Bartlett kernel)

	Coefficient	Std. Error	t-ratio	p-value	
const	0,802398	0,0707737	11,34	<0,0001	***
l_Production	0,868396	0,111697	7,775	<0,0001	***
l_Processing	−0,106120	0,169923	−0,6245	0,5340	

Mean dependent var	−0,148242	S.D. dependent var	0,079168
Sum squared resid	0,178250	S.E. of regression	0,046911
R-squared	0,657350	Adjusted R-squared	0,648890
F(2, 81)	93,76337	P-value(F)	8,31e-22
Log-likelihood	139,3352	Akaike criterion	−272,6705
Schwarz criterion	−265,3780	Hannan-Quinn	−269,7390
Rho	0,900037	Durbin-Watson	0,199125

The estimated regression model:

$$y = 0{,}8024 + 0{,}8684x_1 - 0{,}1061x_2$$

The price transmission inelasticity between variables y and x_1 was estimated at 0.87%. An increase of the retail prices by 1%, can lead to an increase of the primary producer's prices by 0.87% on average. Regression coefficient for the explanatory variable x_2 was statistically not significant and therefore removed from the following regression model.

   In the model 5 the regression function without statistically not significant explanatory in model 4 was estimated. The explained variable y are the milk retail prices. The explanatory variable is primary producer's prices. Constructed model is statistically highly significant and explains 64,88% of the milk retail prices variations.

Model 5: OLS, using observations 2010:01-2016:12 (T = 84)
Dependent variable: l_Retail
HAC standard errors, bandwidth 3 (Bartlett kernel)

	Coefficient	Std. Error	t-ratio	p-value	
const	0,773176	0,0874734	8,839	<0,0001	***
l_Production	0,780979	0,0755161	10,34	<0,0001	***

Mean dependent var	−0,148242		S.D. dependent var	0,079168
Sum squared resid	0,182718		S.E. of regression	0,047205
R-squared	0,648762		Adjusted R-squared	0,644479
F(1, 82)	106,9549		P-value(F)	1,58e-16
Log-likelihood	138,2955		Akaike criterion	−272,5911
Schwarz criterion	−267,7294		Hannan-Quinn	−270,6367
rho	0,907609		Durbin-Watson	0,182877

Regression model has the form:

$$y = 0{,}7732 + 0{,}7810x_1$$

Both, intercept and regression coefficient in constructed model are statistically highly significant. Price transmission was inelastic, and it denounce that an increase of the primary producer's prices by 1%, could cause an increase in retail prices of milk by 0.78% on average.

4   Conclusion

All the statistically significant regression coefficients in our models were positively corelated. Except of one model all the price transmission elasticities were smaller than one. In model 2 the price transmission elasticity 1.0037% for dependent variable processor's prices and independent variable producer's prices was revealed. The lowest price transmission elasticity was found between producer's prices and processor's prices, where an increase in processor's prices by 1% can lead to an increase of producer's prices by 0.34% in average. This model explains 76,68% of changes in explained variable. In reverse, the price transmission elasticity 0.82% was revealed. In model 4 we found the highest price transmission elasticity. An increase of producer's prices by 1% can lead to an increase of retail price by 0.87% in average. At the end we observed the relationship between retail price and producer's prices. An increase of producer's prices by 1% can lead to an instant increase of retail prices by 0.78% in average.

From the results we can conclude, that price changes between individual levels of vertical milk food chain were not fully transmitted or were transmitted with delay. The lowest level of price transmission was found between level of production and processing level (0.34%). In contrary, an increase of producer's prices by 1% can cause an increase of processor's prices by 0.82% or even 1.0037% in average. The highest transmission lever (0.87%) was revealed between producer's prices

and retail price. The significant regression coefficient between processor's prices and retail price wasn't revealed.

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ESTABLISHING CONTINUOUS INNOVATION PROCESSES IN SMES: METHODOLOGY

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Abstract

The paper introduces literature review and methodology, which will lead to subsequent development of a software tool assisting small and medium-sized entreprises in establishing continuous innovation process. The aim of the methodology is to facilitate innovation management techniques for SME, to raise awareness of SMEs of innovations and motivate them to adopt innovation processes into their daily business routine. The paper highlights factors of personal traits of SME owners and managers such as self-motivation, self-determination and willingness to change, which are crucial for suggesting, developing and implementing any innovation efforts within a company.

Keywords: *Innovation process, SMEs, self-motivation.*

JEL classification: *M10, L21, L26*

1   Introduction

There can be seen big innovation development in companies recently (Koudelková, 2013). According to Heřman & Horová (2013), the term innovation is derived from the latin word "innovare", which they translate as to renew. Vlček

(2011) translates the same expression as a change leading to something new. From this we can deduce that neither this translation nor the definition of innovation will be uniform as the term innovation as well as all terms derived from it have constantly been developing.

Novák (2016) considers innovation "renovation and enlargement of the range of products and services, related markets, creation of new methods of production, delivery and distribution as well as introduction of changes in management, labor organization, conditions and qualifications of workers.

Innovation is linked with a new idea, which is usually the primary impulse for a change. Many obstacles may occur when introducing a change. These may make the whole process more complicated or even longer, which means innovation may influence the operation of a company in a positive as well as a negative way. It would be nice to have only positive results but unfortunately things do not always end up like this. If a company does not evaluate the situation properly and starts introducing wrong innovation, it can experience serious consequences e.g. production decline, drop of customers´ interest or increase of costs. That is why each decision dealing with innovation should be carefully considered.

One of the main goals of running a business is to get advantages of competition. This can be reached on supposition that creativity and positive attitude towards changes in all areas are included in the process of continuous changes. According to Florida (2002), changes occur even in the management process; business blends with innovation and culture in the society as well as in the company itself. The field in which company managers would welcome help from the side of universities and researchers is how to differenciate individual ideas, select the high-quality ones that have high probability of success in the future, and continue in their further development. (Von Stamm, 2008)

Small and medium-size enterprises are an important part of economy, nevertheless we cannot ignore that one may sometimes meet here some reluctance to accept changes in production, management, or unwillingness to expand. Another fact that we cannot fail to notice these days is that innovation processes in companies are influenced by changes of the outer environment (ie other entrepreneurial and non-entrepreneurial subjects) as well as by behavioural changes within companies so quickly that everyday routine fails to respond to these, e.g. it lacks self-reflection. Collins (2017)

Although various innovation processes, which are mostly geared towards product innovation, have been introduced in the literature, their core ideas remain similar. Very early on, new product ideas progress through testing, feasibility and market screening to trial runs and commercialization. Rapid technological changes and advancements have pushed companies towards ever faster

innovation cycles and speedier innovation process. On the other hand, SMEs have been reported to have limited resources (Lee, Yoon & Park, 2010) and therefore a greater need either of simplification of the innovation process or collaboration with other entities in various stages of the innovation process (Narula, 2004).

Innovation processes have been analyzed through historical perspectives as well as epistemologically. Marinova & Phillimore (2003) distinguish between six generations of innovation models: 1. Black box model; 2. Linear model; 3. Interactive models; 4. System model; 5. Evolutionary model; and 6. Innovation milieu model. Meissner & Kotsemir (2016) propose that innovation models can be categorized into "conceptual" driven or "innovation management" driven.

Various authors outlined and emphasized different steps and different challenges on the way towards innovation, whether product-innovation; process-innovation, or other. For instance, the innovation processes, which shall culminate with a new product, can be undertaken in the following steps (Cooper & Kleinschmidt, 1986): 1. Initial screening; 2. Preliminary market assessment; 3. Preliminary technical assessment; 4. Detailed market study/market research; 5. Business/financial analysis; 6. Product development; 7. In-house product testing; 8. Customer tests of product; 9. Test market/trial sell; 10. Trial production; 11. Precommercialization business analysis; 12. Production start-up; 13. Market launch. More recently, Säfsten et al. (2014) focus mostly on the production side of innovation and sum up the innovation process into three separate but often parallel phases: 1. Technology development, 2. Product development; and 3. Production. Lately, the issues of customer involvement (Schaarschmidt & Kilian, 2014) or sustainability (Dangelico & Pujari, 2010) are believed to be the key for successful innovation. Lately, only partial areas of the innovation process were further analyzed. Innovation process planning model (Jurczyk-Bunkowska, 2013) pays special attention to the very early stage of systematic innovation management and distinguishes three interrelated steps (1. Identification of needs; 2. Assessment of knowledge gap; 3. Planning cycle), which are anchored in the internal as well as external business environment.

In the section of this paper called "Results and Discussion" it is recommended to adjust the above-mentioned innovation processes and emphasize especially the steps related to evaluating the ability to introduce innovation. Regarding this fact, the authors used the VRIO analysis as a tool to access the management of companies. To conduct the actual control of innovation based on the suggested innovation process, it is recommended to use features of self-motivation that are as well described in this paper.

2   Data and methodology

The aim of this article is to reason the possibility to improve the innovation process by supplying it with the VRIO analysis and self-motivation features of sustainable management of changes in SMEs.

We have outlined theoretical points of view to understand and accept changes in the innovation process so that these may become the base for the methodology of management of the innovation process which will next year include the software tool SIP-SME. This tool is being developed within the project "Service for Innovation Process in SME". This methodology is aimed to enable the manager to analyse the intended innovation with a certain distance and in proportion. The methodology takes into consideration the inclusive approach because it is based on the assumpion that the innovation process is mainly focused on the user (so called construction process) Collins (2017). At this point the methodology is becoming a method aimed to be communication-friendly.

We have used theoretical conclusions for the detailed analysis of the innovation cycle. The aim was to provide the innovation cycle with the missing part that might become a self-motivation tool for easier and more effective acceptation of very frequent changes in the innovation process. We have as well utilized the theoretical conclusions stimulating the self-motivation features to accept changes.

To explain the interdisciplinary relations, we proceeded on the analytical-synthetic scientific method. The draft of the innovation process applicable in MSP was carried out based on the study of professional literature and discussion with the authors of the paper.

3   Results and discussion

This methodology is aimed to facilitate and ease the management of innovation so that the innovation effort may become a common, routine and well-accepted activity complementing the constatnt innovation process. It will be used in the process of creating and implementing tools for managing the innovation processes in SMEs, one of these tools will be a specialized software. Thus the innovation process in companies, using this methodology and its tools, may become a common and permanent process on the same level as other processes within a company (human resources, marketing, logistics, financial management…), a process without which no company can plan its further existence and efforts to keep a continuous increase of its competitiveness.

We have presented this methodology of innovation processes management in order to prevent the negative features of innovation implementation and to support its positive impact.

Other goals of our methodology are as follows:
- To discover a way to improve the current process of innovation management (using new, specific knowledge, skills development, better organization, or re-conciliation with the current situation).
- To facilitate the retrieval of necessary data linked to the innovation process.
- To utilize new facts about functioning of the human brain for the company owners to be able to analyze the innovation process within their companies by themselves, in proportion with other processes in the companies.
- To reach exact innovation in a company using the suggested procedure.

3.1   Changes suggested in the process of innovation management

The following phases of the innovation process have been outlined bassed on the discussion of authors of this paper and the comparison of individual approaches in professional literature (see the Introduction of this paper).
1. Incentive of innovation.
2. Suggestion of innovation.
3. Searching for conditions of innovation.
4. Development of the innovative solution.
5. Testing of the innovative solution on the market.
6. Introductin of innovation.
7. Verification of the rate of success.

According to the authors, the key phase for a successful implementation of innovation is especially step 3) Searching for conditions of innovation. In this phase, the use of VRIO analysis can be recommended. It represents one of the methods of strategic management and it is used to evaluate the condition of the company based on the evaluation of its sources. It may also lead to specification of the competitive power of the company. The VRIO analysis is based on so called approach of sources which is largely based on the theory of the microeconomic allowance (Ricardo, 1956) and Schumpeter´s approach to reach competitive advantages using innovation (Schumpeter & Swedberg, 1996). The empirical studies confirm that the approach of sources is more suitable to determine the competitive position than the approach of position described by Porter (1998). This is mainly due to the fact that differences in profitability within a branch are more important than differences in profitability between branches (Schmalensee, 1988;

Buzzell & Gale, 1987). This means that Porter´s approach of position which suggests that the attractivity of a branch is the primary source of profit generation has not been confirmed (Porter, 1998).

Barney (1991), who is the author of the VRIO analysis, suggests that if we want to exploit sources to reach a constant competitive advantage, these have to show the following qualities: they must be valuable – bring certain value to the customer; rare - it should not be easy to get them on the market of sources; costly to imitate and suitable for exploitation by the organization. The survey of individual sources including their competitive consequences is listed in the following graph.

Graph 1 The course of questioning when using the VRIO analysis (adapted Rothaermel, 2015)

A source must fulfil all four basic prerequisites at the same time to provide a certain competitive advantage.

3.2   Suggested procedures in the management of changes

Our methodology also uses the data from the latest researches dealing with functioning of the human brain. These researches confirm that a new idea has a very short life and if it is not further exploited, it disappears (Rock 2007). If we want to form new ideas, it is necessary to create a suitable environment, e.g. get rid of many details and disturbing moments that only distract our attention (Košovská at al.2014).

Further on, our methodology draws upon the latest facts about SMEs management, ie the constant effort to keep and improve competitiveness through application of active changes and supporting the innovative ability of companies. To be able to do this we must know the basic condition of each company. The methodology respects the importance of SMEs in the economies of the European Union. It follows the research among 157 managers done by the agency Ipsos in 2015. This research was called: "Industry through the eyes of managers and the general public". Managers in this research labelled the improperly set legislation as the biggest hindrance to innovation. The second most important obstacle was the people´s reluctance to look for new, creative ways. Our methodology aims to eliminate the second barrier.

There are many axioms, theoretical approaches and manuals dealing with the problematics of innovaton implementation. They contain sets of rules that must be kept, possible barriers as well as suggestions of functioning under certain conditions. None of the authors solves any specific innovative process in a particular company. If a company hires an expert in innovation management supposing everything will be solved successfully, they may not be always satisfied. The main barrier in a system implemented through external consultants is the functioning of the human brain. Each of us evaluates available information in a different way, either based on our own experience, or through emotional relationships. In this case the advice of an external consultant may not be always accepted positively. (McGrath & Bates 2013).

We consider the most beneficial option creating a methodology which will enable each user to manage the innovation process him/herself through leading questions, to keep the highest possible level of sincerity. The questions should be predominantly open, closed questions may be used exceptionally. The set of questions will be organized into a decision-making tree. A form will be printed after finishing this questioning. It will contain the information concerning the evaluated situation and its future perspective filled-in by the person questioned as well as a set of recommendations resumed by the team.

A sample recommendation is e.g. to make a more detailed analysis of a certain source labelled like a weak point in the VRIO analysis, or to participate at

a special training aimed to enlarge specific knowledge of innovation, possibilities to finance innovation from different sources, or focused on personal development and organizational skills to manage the process of innovation.

The set of questions will be prepared in a way to help eliminate the reluctance to implement any change. It will be based on facts from the research of the process of change implementation (Duhigg 2012, 2013).

The willingness to introduce changes can be increased by supplementing the set of questions with open questions used in couching interviews (Whitmore 2011, 2010).

Couching is one of the sources for creating questions in our methodology. Couching in the form of self-couching is based on the significantly adjusted Grow model (Whitmore 2010), Managerial audit (Stejskalová, Rolínek 2008, 2011), with implemented features of systemic couching (Zatloukal & Vítek, 2016). From the systemic coaching we have used mainly the part focusing on the identification of the non-problem which is the idea of what the company will look like company after the innovatin is introduced. This feature joins the methodology with the supporting questions according to St. John (2014).

The methodology further on reflects the management of change (McGrath & Bates 2013). It is mainly based on the modern approach to the management of change.

The possible basic structure of an interview might be as follows:
- Searching for aims.
- Analysis of the current state.
- Suggestion of possible solutions.
- Composition of the plan of implementation of the change.

In the first part of the set of questions we will especially focus on creating the right atmosphere for creative and positive thinking. We will be looking for aims related to the development of the company.

In the second, analytical part we will use the set of questions from the VRIO analysis enriched by complementary questions from the field of the process maps and other analytical tools used to evaluate the current situation in the company. This enables the company manager to see the innovation process in proportion. At the same time, he will be able to use the evaluation of sufficience or insufficience of process management compared to their best competitor. Last but not least the aim of the analysis is to observe the approaches of senior executives to change.

Based on the executed analysis, there will be added questions leading to setting suggestions for changes in management. E.g. how could the company manager

introduce the possible innovation of the management process. It is advisable to prepare more varieties of solution presented in a feasible way. It means what the individual situation will look like after implementation of innovation, who will do it and at what cost, etc. This research is done to eliminate the number of varieties so that it is possible to identify just one goal of the future innovation efforts of the company.

Within the set goal we should identify the first simple step leading to change that must be implemented as soon as possible (within days). That way we will encourage the manager to get over the resilience to the change and to start working towards the goal. The manager will create a plan responding to the following questions: What will be done? Who will do it? What is the deadline? This part is in some way a deal with him/herself, which is considered very effective in the frame of systemic coaching. If we add other questions: What positives will bring the implementation of this step? How shall we reward the person who will be responsible for the implementation of the change? We will use the positive results of the research of change implementation presented in the book (Duhigg, 2012; Haberleitner, Deistler, & Ungvari 2009).

The previously developed methodology Stejskalová, Rolínek (2011) "Methodology of managerial audit in SMEs" did not focus on the management of processes in the field of research and development, that is why the currently developed methodology for management of innovation processes and a SIP tool is aimed to fill in this gap. This methodology was prepared as a starting point for preparation of work on the SIP-SME software tool which will help the continuous management of innovation.

4 Conclusion

The aim of this paper was to introduce a methodology that might be the starting point for preparation of a software tool for innovation management. There have been set the basic goals and approaches. The principal approach is using the VRIO analysis for evaluation of the sources of a company as well as the conditions for implementation of the intended innovation. The second main approach is the exploitation of new information about functioning of human thinking to naturally support the motivation to smoothly accept changes. It is necessary to mention that the authors were aware of the fact, that every innovation is a change but not every change is a piece of innovation. That is why the creation of the software tool will be based on the management of changes in general. However, the individual steps will have the necessary form to support those changes which can be considered innovation. To combine the requirements of standart definition

of the innovation process with change management seems to be a difficult, but necessary task. This task is difficult mainly because it differs from the currently presented view of the innovatoion process.

Acknowledgements

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TOURISM MARKETING DEVELOPMENT AND ITS ROLE IN ECONOMY OF ALBANIA

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Abstract

This research refers to the main word of the last decade in Albania as one of the key factors in economic development, Tourism. Ranked frequently by the prestigious Media and World Tourism Organizations, Albania is being presented as one of the favorite destinations in the last decade. Gross Domestic Product growth with 8.4% and employment of human resources to 23.9% of total employment, at different levels, have made tourism one of the most powerful sectors with total support of Central Government. Tourism is one of the few branches of the economy that competes with dignity in the international market. Albania has a full package of tourism products in its portfolio, such as,: cultural, natural, health and conference / business tourism. As a package it creates the opportunity to expand the group of visitors who displays special interests for tourist activities. Lack of public and private investment, lack of well-known hotel brands and tour operators, informality, lack of human resource training, competition analysis, poor technology utilization, legal framework, lack of standardization have made Albania compared to Region and those of the European Countries, to have disadvantages in a normal development of tourism. In this study we have analyzed as well, 4P Marketing in Albanian Tourism, such as Product, Price, Place and Promotion. We also investigated the Location Marketing ("Albania Go on Your Way" slogan), Activity Marketing (hiking, canyon, camping), corporate marketing etc. The results achieved by the use of marketing elements and design of marketing plans by promoting and supporting as key columns of the country's economy. The statistical analysis from 2011 to 2017 on the progress of Tourism growth and effects in economy will be on focus of our paper.

Data in the study was collected from primary as well as secondary data sources (observations, internet resources, press and visual media).

1   Introduction

Tourism is a set of economic activities that are combined with each other in order to meet the needs of individuals related to the movement of people and spending free time. Nowadays, tourism represents a whole industry, as it involves the exploitation of natural resources, the transformation of natural and human resources, tourism products and services.

By the meaning of great potential and it plays an important role in meeting the key macroeconomic objectives related to economic development, employment, and sustainable economic and social development. Influence and Impact, there is turbulence in nature, political environment and culture are diverse. Economic impact is the most distinctive and has the greatest importance in overall development and this is due to the functioning of all the components of the chain.

Tourism in Albania contributes on increasing national incomes, creates employment opportunities, limits the trade deficit gap, strengthens economic development in peripheral regions, intersects the activity of enterprises that produce goods and services that meet the needs of either the right or the tourist. In recent years, Albania is focusing on economic policies to promote tourism as a powerful potential in the international arena as a sustainable source for economic growth.

Tourism has an important and very positive impact on Albania's development as well as it's progress. Albania has a competitive position in the regional tourism market. Due to it's geographic position and natural potential, Albania competes convincingly in the global market and in the region. It is characterized by a continuous development and a high sensitivity, facing insecure internal and external factors, today it is the one that has the world's attention, the drafting of strategic plans, in keeping with the political, social, economic, technological and environmental environment. As a sector of the economy, it affects the growth of Gross National Product, debt consolidation, job creation, investment growth and promotion of local, regional and national development.

Albania, refers to its slow economic development due to a closed-door economy, from the system of about 50 years of communism, has undergone a rapid development in tourism, driven by the increasing intensity of tourist resources by locals and aliens.

Tourism is in the most important projects of the Government, so that Albania is promoted as a destination of attraction for tourists, developing a sustainable

tourism by ensuring tourists that the services providers in order to meet the tourist requirements in a healthy and secure environment, by respecting the needs of future communities and generations. With this aim the drafting of legislation and supporting mechanisms has done the good functioning of all the links of the economy in Tourism.

1.1   Legislation

- LAW NO. 93/2015 ON TOURISM
- LAW NO. 114/2017 FOR SOME ADDITION TO LAW NO. 93/2015 „ON TOURISM"
- LAW NO. 71/2017 FOR AN ADDITION TO LAW NO. 92/2014, "ON VALUE ADDED TAX", CHANGED

1.1.1 Marketing of Tourism in Albania

Based on following statistical data, Tourism is an ever-increasing scale and the most influential in the economy. The marketing and communications tools have significantly increased the efficiency and sophistication of the tourism services in the country. Because of the integration of the policies and mechanisms of the law, the development of Small and Medium Enterprises, hotel structures and restaurants have made Albania not the same as 20 years ago. Every day more awareness is gained by tourists and tour operators, in improving marketing methods and marketing elements in the tourist market. Small companies have started to undergo significant development due to the use of marketing in selling and trading their goods and services.

Tourism has also become more diversified over the last few years and is now seen to consist of three main areas of the product:
- *Coastal tourism*, where it has developed as the main product that focuses on "beach and sun" tourism. The main coastal destinations are Velipoja, Shengjin, Durrës (Adriatic Sea), Vlora, Himara, Saranda, Ksamili (Ionian Sea). The "beach and sun" product in some regions of Albania offers advantages in the natural environment, accommodation facilities, culinary services and special services.
- *Cultural tourism*, though not the main focus, Albania's resources and history in heritage of archeology and culture, offers considerable potential. This area has been identified as Albania's main points by various visitor observations and foreign trade travel trade. Albania offers three World Heritage Sites:

Butrint Archaeological Park, Berat and Gjirokastra UNESCO, followed by a number of historical and cultural attractions and monuments.

- Natural-rural tourism-eco-tourism, the climate of Albania, geography and physical diversity of the territory, represented by a series of mountains, lakes, rivers and lagoons is accompanied by rich biodiversity of flora and fauna. These are present in a number of national parks and natural reserves within the country. Natural and rural areas in Albania offer opportunities for rural tourism development, ecotourism and outdoor activities (river rafting, paragliding, mountain biking, fishing, trekking, climbing, hiking, horseback riding, study trips, etc.). Some of these activities are the main motivation for visits of foreign visitors to these countries.

The main actors dealing with tourism marketing in Albania are:
- Ministry of Environment
- National Tourism Agency
- The Marketing Organization of the Destinations
- Tourist Information Office

All the above-mentioned actors serve as a mechanism for the prediction of a proper regulation, maintenance, and a strategic plan for the well-functioning of all the influential factors in tourism. The preparation of stands at various fairs, the preparation of promotional materials, the preparation of maps and information at local level, the organization of events in order to promote local and local culture in the region and beyond, are some of the factors influencing the development of Tourism and marketing in Albania. Online tour booking through the widespread use of the IT support factor, cultural tourism and UNESCO-protected heritage, such as Butrint, Gjirokastra, Berati, and the Ionian Coastline, are becoming recognizable identifying marks for Albania.

However, it is worth mentioning that tourism marketing in Albania has its beginnings in 2005, followed in 2006 by the world's first tourism media in Albania by prestigious media in the world, CNN. Promotional and publicity spots have always brought the number of visitors and tourists to the country, with a diversification of their backgrounds, such as Italy, England, Germany, USA, Poland, France and so on.

One of the most popular forms for promoting Tourism in Albania and not only, anywhere in the world, are undoubtedly social networks such as Facebook, Instagram or Twitter, where every structure such as Hotels, Tourist Agencies and Restaurants manage such accounts, and make a publicity over the products and services they offer, thus bringing a good idea and a widespread promotion to the

virtual world, which is closely linked to the use of a large number of the population.

Local Marketing is also being used recently in Albania, where through the licensing and management of social networks, tourism destination labels have been developed, thus separating photos, video experiences, resulting in structures receiving a promotion from tourists and a real show about what is offered.

One of the latest projects developed and drafted by the government is the implementation of the July - December 2017 campaign, with the promotional slogan "Go Your Own Way", followed by media spots and participation in international fairs such as the Stuttgart CMT developed in January 2017, have developed Immediate Tourism in Albania.

As below, some of the projects with a duration determined by the Albanian Government:

1. "Consume-Less Project in Mediterranean Tourism Communities" aims to significantly reduce waste in terms of energy, water and waste at the local level. The project focuses in particular on the specific nature of tourist areas which it is necessary to define and implement sustainability policies aimed at reducing water, energy and waste production by setting different types of actions that take into account the particularities of tourist areas. Duration of the 2016-2019 Project, Budget 2,635,000.00 (Albanian Leke).

2. Albania, Travel Your Way: Integrated Management of Rural and Cultural Tourism in the Regions of Gjirokastra and Berat (TREC) Areas: Permet, Skrapar, Girokastra, Berat Duration: 3 years Partners:

   CESVI
   National Tourism Agency
   Traveling the Balkans
   Sangro-Aventino Development Agency

Other key actors: Municipality & Besa Fund

1. THEMA Project Duration: 2 years Partners: Epirus Development Agency, Ionian Region Hotels Association, Regional Development and Cooperation Center (Gjirokastër), National Tourism Agency, Gjirokastra Prefecture Areas in Albania: City of Gjirokastra.

2   Data and Methods

Data in the study are collected from primary as well as secondary data sources (observations, internet resources, press and visual media).

The research methods in this paper are qualitative, for developing a basic research model, through content analysis, literature study on theoretical knowledge of the concept of tourism and tourism marketing. The Quantitative Approach consists of the financial and numerical statistical data, as well as their analysis.

The revenues from the tourism sector for 2016 arrived at 1,528 million Euro. Compared to the period of 2015, the revenues from tourism increased 13% due to the increase of foreign visitors and their length of stays. Trend has remained the same for the first half of 2017 compared with same period of 2016.

The table below shows the revenues and expenditures of tourism in Albania in 2010-2016.

In million Euro

	2010	2011	2012	2013	2014	2015	2016	First half 2016	First half 2017
Revenues	1,226	1,169	1,145	1,106	1,283	1,353	1,528	640	722
Expenditures	-1,032	-1,121	-1,003	-1,113	-1,196	-1,117	-1,139	-500	-567

Source: Bank of Albania.

Information on the daily expenditures from foreign visitors in Albania is shown below.

In Euro

	2010	2011	2012	2013	2014	2015	2016
Daily expenditures	81	70	62	64	68	71	68.5

Source: Bank of Albania.

The daily expenditures of the foreign visitors in Albanian decreased in 2016 compared to 2015, but are still above the low level of 2012.

Length of stay increased in 2016, by one day for non-resident visitors coming for personal reasons and decreases slightly for business visitors, compared to 2015.

Daily expenditures from non-resident visitors in 2016 do not change for business visitors and decreased by 4 Euro per day for non-resident visitors coming for personal reasons compared to 2015.

The World Travel and Tourism Council (WTTC) (www.wttc.org)[68] calculates that the direct contribution of tourism in the Gross Domestic Product, in 2016 arrived at 127.7 billion ALL, or 8.4% of the GDP. The total contribution was valued at 393 billion ALL or 26% of GDP. The direct and total contribution in 2016 increased compared to 2015, respectively by 8.9 % and 8.4%.

In %

	2010	2011	2012	2013	2014	2015	2016
Direct contribution to GDP	6.4	6.1	6.1	4.8	5.9	6.0	8.4
Total contribution to GDP	23	21.7	21.4	16.7	21	21.1	26

Source: WTTC.

Total contribution to employment increased by 8.1% in 2016 compared to 2015.
In %

	2010	2011	2012	2013	2014	2015	2016
Direct contribution to employment	5.6	5.2	4.9	4.2	5.3	5.5	7.7
Total contribution to employment	20.1	18.4	17.2	15.2	19.2	19.3	23.9

Source: WTTC.

Table 1 **Arrivals of Foreign citizens by mode of transport**

	2009	2010	2011	2012	2013
	1,855,638	2,417,337	2,932,132	3,513,666	3,255,988
By air	227,186	245,756	267,359	273,071	314,074
By sea	214,555	216,079	190,998	180,125	181,794
By land	1,413,897	1,955,502	2,473,775	3,060,470	2,760,120

	2014	2015	2016	First half 2016	First half 2017
	3,672,591	4,131,242	4,736,000	1,600,695	1,759,294
By air	337,161	400,742	457,000	183,123	225,010
By sea	197,919	211,556	276,000	70,368	109,986
By land	3,137,511	3,518,944	4,003,000	1,347,204	1,424,298

Source: INSTAT and Ministry of Tourism and Environment.

[68] ttps://www.wttc.org/-/media/files/reports/economic-impact-research/countries-2017/albania2017.pdf

According to INSTAT data for the period 2014-2017, the inflows of foreign nationals by region have always been increasing. Citizens from Africa, America, Eastern Asia, the Middle East and South Asia in 2014 score a total of 3 672 591 and in 2017, 5 117 700 in total. Also foreign foreigners from Europe mark a total of 3 423 665 in 2014 and in the year 2017 the total number of foreign visitors to Europe goes to 4 686 695.

3   Results and Discussion

One of the most popular and most popular forms of promotion are social networks, which are generally not differentiated by structure structures due to the similarity they have in promotion.

- Tourist businesses in the country do not have the professional capacity to build and apply cross-marketing policies with each other, not using pricing and distribution policies.
- Most businesses use the agency's location as a promotion factor.
- Businesses in Albania do not develop detailed marketing plans, and do not use other mix marketing elements such as personal sales, sales promotion, or public relations.
- Lack of qualified personnel, not using expertise in knowledge and studies.
- Increased number of agencies and tour operators have overcrowded the market, so the products are similar and often undifferentiated, dishonest competition in prices and disinfection of products
- Businesses do not contribute to much on Marketing, so they do not Promote Albania as a destination. The contractual agreement with Booking or Trip Advisor, the two most powerful operators in the world regarding hotel or restaurant reservations have made Businesses take more seriously starting from 2015 on wards, promotion through pictures, prices, bids, investment the increase in services, and the increase in the number of tourists in the country.

4   Conclusion

To conclude, all these analysis and reviews are done, in order to bring a new concept of tourism marketing in Albania, for the effectiveness and development of tourism industry. By statistical analysis and resources Albania is addicted to be a potential place for Tourism in region, and not even. A common strategy is to be followed to give more tourism products with quality and quantity. Creating

it's originality and authenticity brand, will help Tourism to be more famous and a key factor for growing of economy and employment in Albania.

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GREENHOUSE GAS EMISSIONS IN POLAND. CURRENT STATE AND REDUCTION STRATEGIES 2020-2050

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Abstract

Reduction of greenhouse gases is the key climate-related issue, both in Europe and worldwide. Therefore, the European Union imposed an obligation to achieve the targets specified in the climate and energy package on Member States, i.e. reduced the emission by 20% until 2020 when compared to 1990. These and very other reasons show an overriding need for ongoing efforts to improve the methods of reducing greenhouse gases. The objectives of this study are as follows: (1) to present the current quantitative and qualitative emission of greenhouse gases in Poland, (2) to show the strategies to reduce greenhouse gases in the years 2020-2050, (3) to identify the main barriers that prevent greenhouse gas emissions in Poland, (4) to choose the most probable scenario of reduction of the amounts of gases released to the air in Poland for the years 2020-2050. The analysis of the concepts available shows that implementation of the 'renewable' and 'nuclear' scenarios is less likely than the 'coal' scenario. This demonstrates that there are too many factors that hinder the implementation of the concepts to reduce greenhouse gas emissions in the power sector in Poland. What we definitely need is long-term changes (scenario for the next 25 years) to re-shape the mentality of the Poles and reduce economical barriers, which seem to be crucial for the process.

Keywords: *greenhouse gases, greenhouse gas emissions, barriers, strategies to reduce greenhouse gas emissions*

JEL classification: *Q54, Q56, Q58*

1   Introduction

Reduction of greenhouse gases is the key climatic issue, both in Europe and worldwide. Having noticed the increasing problem, the European Union imposed on Member States an obligation to achieve the targets specified in the climate and energy package (Miciuła,2014; Kumar & Madlener, 2017; Su et. Al., 2016), aiming to reduce emissions and enforce strong reaction to consequences of climatic changes. The EU plans extend well beyond 2020 (Skwierz, 2016; Sówka & Bezyk, 2018). All this is done to prevent climate changes from reaching a dangerous level. The international community set a target of keeping global average temperatures from rising 2°C (compared to temperatures pre-industrial revolution).

As a result of the restrictions introduced, most of the EU-28 Member States have reduced annual emissions of greenhouse gases when compared to 1990[69,70]. Among the positive aspects of the changes introduced is improvement of the quality of air and other elements of natural environment. Despite the considerable improvement of conditions, we must not forget the ongoing economic growth and dramatic consequences of previous activity of man.

In 2015 the overall amount of greenhouse gases emitted in Poland equalled 356997.90 kt CO_2 eq. National CO_2 emission to the atmosphere plays crucial role, as it constitutes 80% of all GHG produced in Poland. Methane and dinitrogen monoxide play smaller roles, i.e. 12% and 6% respectively, with fluorinated industrial gases taking the remaining 2% (KOBIZE, 2017). Even if in smaller amounts, dinitrogen monoxide and fluorinated industrial gases must not be underestimated when it comes to their impact on greenhouse effect, as they have significant heat absorption properties (Różański et. al.,2016).

The key GHG emitter is power industry (81%). Other categories, i.e. industrial processes, land use and agriculture release 8% GHG each. Waste constitutes 3% of total emission of greenhouse gases in Poland. In this list, land use and land conversions are designated with negative values, meaning that they absorb carbon dioxide (KOBIZE, 2017). These gases do allow the Earth's absorption of solar radiation *but prevent* the thermal radiation from going out, wherefore temperatures grow.

These very examples show an overriding need for ongoing efforts to improve the methods of reducing greenhouse gases.
The objectives of this study are as follows:
- to present the current quantitative and qualitative emissions of greenhouse gases in Poland,

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[69]   https://ec.europa.eu/clima/policies/strategies/progress_en
[70]   Energy Policies of IEA Countries - Poland 2016 Review. Retrieved from: www.iea.org

- to show the strategies to reduce greenhouse gases in the years 2020-2050,
- to identify the main barriers that prevent reduction of greenhouse gas emissions in Poland,
- to choose the most probable scenario of reduction of the amounts of gases released to the air in Poland for the years 2020-2050.

The present study contains an analysis of individual options and of relevance of introducing different strategies to reduce greenhouse gas emissions in the energy sector.

2   Data and Methods

Two research techniques were used to analyse the possible options of reducing greenhouse gas emission. It was a survey conducted in January 2018 among persons from different professional circles with theoretical and/or practical experience in the field; and analysis, as part of which individual properties and incidents were identified and their relationship with the whole were described. Plus, an overview of the available scientific literature was performed. 32 of the 100 surveys entitled: "Analysis of barriers for greenhouse gas emission reduction in Poland" were sent back. The respondents were selected from:
- state environmental authorities and authorities from the sector of energy,
- companies specialised in ecological counselling,
- research units.

Relying on experts' knowledge and the literature available (Szywała, 2016), 27 factors were distinguished with potential significance for the reduction of greenhouse gas emissions in Poland (Swora, 2011). The factors were divided into 5 groups (Table 1).
Another method used in the study was the scenario method (Nabielak et. al., 2018). The scenarios selected were supposed to facilitate expert assessment of the likelihood of application of individual reduction methods in the years 2020-2050. The scenarios were as follows (Kolasa-Wiecek,2015):
- coal as the main pillar of the energy sector; reduction of greenhouse gas emissions through modernisation and improvement of performance of the existing systems,
- increasing the production of energy from renewable energy sources with gradual diminishing of the role of coal-based energy production,
- replacement of lignite combustion with nuclear power in the process of energy production.

Table 1 **1st and 2nd order barriers which may potentially favour the freezing of wind power development in Poland**

Parameter symbol	Barriers
L	Legal (legislative) barriers
T	Technical and technological barriers
E	Economic barriers
S	Social and cultural barriers
I	Infrastructural barriers

3   Results and Discussion

The respondents indicated the coal scenario as the most likely[71]. More of 40% of them are of the opinion that the future of the Polish economy shall be mainly based on coal (Szczerbowski, 2016; Molo, 2016; Greinert, 2014). The above confirms the governmental plans[72,73], which indicate own resources (meaning mainly coal) as the foundation of the Polish power sector. The least likely scenario indicated by the respondents is the nuclear one (only 21% of votes). Total generation costs in analyzed scenarios are similar (the difference in cost ca. 6%), but there is a large difference in the reduction of CO2 emissions by 2050. Diversification of energy mix will improve energy security and independence of import in Poland[3].

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[71] Polski sector energetyczny 2050. 4 scenariusze. Forum Energii 2017
[72] ttps://www.salon24.pl/u/energetyka/823161,kongres-590-przyszlosc-energetyki-opartej-na-weglu-coraz-ciemniejsza [accessed: 23.01.2018]
[73] ttps://www.salon24.pl/u/energetyka/753466,polska-energia-z-wlasnych-zrodel-wegiel--przede-wszystkim [accessed: 23.01.2018]

Figure 1 **Likelihood of implementation of individual scenarios in the opinion of respondents**

Source: Author's own work.

Nearly 1/4 of all respondents consider economic barriers to be the most important factor hindering the reduction of GHG emissions in Poland, while infrastructural and legislative barriers are thought to be the least significant.

Figure 2 **Significance of 1st order barriers hindering greenhouse gas reduction in Poland**

Source: Author's own work.

In part two of the survey, respondents were asked to distribute 100% among all 2nd degree factors.

In the opinion of respondents, all 2nd order barriers are comparably important. The most important were: support for pro-coal policy and absence of a coherent, sustainable development policy pertaining to air protection. The trade unions'

support for the government was, however, considered to be the least important barrier for greenhouse gas reduction.

Figure 3 **Significance of individual 2ⁿᵈ order legislative barriers**

L1	Instability of activities of the local and state authorities; support for pro-coal policy
L2	The biggest power companies are state-owned; absence of a coherent, sustainable development policy pertaining to air protection
L3	Trade unions' support for the government.
L4	Absence of a greenhouse gas emission monitoring module in the non-ETS system and lack of severe penalties for exceeding certain standards.
L5	Slowdown in the development of renewable technologies, including RES.

Source: Author's own work.

Respondents indicated inadequate school education on greenhouse gas emissions and impact of greenhouse gases on human health and the environment as the most significant 2ⁿᵈ order technical/technological barrier. In their opinion, factors such as lack of methods for quick measurement of concentrations by users and withdrawal of companies offering specific solutions from the Polish market are far less important when it comes to hindering greenhouse gas reduction.

Figure 4 **Significance of individual 2nd order technical and technological barriers**

T1	Inadequate education on greenhouse gas emissions and on impact of greenhouse gases on human health and the environment at schools.
T2	Lack of experience in the implementation of scientific and technical achievements (transfer of knowledge).
T3	Lack of methods for quick measurement of concentrations by users.
T4	Withdrawal of companies offering specific solutions (e.g. low-carbon technologies) from the Polish market.

Source: Author's own work.

In the 'economic barriers' group, respondents chose high costs related to modernisation of the existing installations needed in order to shift towards a new energy carrier and high investment costs connected with new technologies as the most

significant. Other factors were considered to be on a slightly lower, comparable level.

Figure 5 **Significance of individual 2nd order economic barriers**

E1	High costs related to modernisation of the existing installations needed in order to shift towards a new energy carrier (e.g. coal replacement with gas or RES).
E2	High investment costs of implementation of new technologies (e.g. RES) that need to be incurred at the start.
E3	High costs of obtaining 'clean' energy, e.g. RES, alternative energy.
E4	Inadequate support for RES/alternative energy by the European Union.
E5	Unstable and insignificant state funds allocated towards improvement of efficiency of the technologies.

Source: Author's own work.

In the view of respondents, the biggest role in the 'social/cultural barriers' group is played by years-long habits of using heating systems based on coal or other energy-generating raw materials. Lack of social awareness and knowledge of the methods to measure greenhouse gas concentration was assessed as not half as important.

Figure 6 **Significance of individual 2nd order social/cultural barriers**

S1	Years-long habits of using heating systems based on coal or other energy-generating raw materials (including waste or rubbish).
S2	Limited awareness connected with waste burning, low-quality coal and other energy-generating raw materials.
S3	Miners lobbying further use of coal.
S4	Providing prices of power produced from fossil fuels net of external costs (costs of maintenance of unprofitable mines, double end-of-year bonuses for miners, environmental costs, healthcare costs etc.), aiming to keep the society convinced that coal energy is the cheapest choice.
S5	Lack of social awareness and knowledge of the methods to measure greenhouse gas concentration.
S6	Weak recycling and secondary raw material recovery culture.

Source: Author's own work.

Households dominated by low-performance stoves fired by low-quality raw materials and the use of coal as the foundation for industry and local boiler houses were considered the crucial 2nd order infrastructural barriers. In the opinion of respondents, lack of coherent methods to measure concentrations plays a negligible role in the reduction of greenhouse gas emissions in Poland.

Figure 7 **Significance of individual 2ⁿᵈ order infrastructural barriers**

I1	Households dominated by low-performance stoves fired by low-quality raw materials (coal dust).
I2	Import of old vehicles, not satisfying the emission performance standards, for use in Poland.
I3	Using coal as the foundation for industry and local boiler houses.
I4	Waste water treatment plants and landfills are characterised by poor performance and effectiveness.
I5	Intense vegetable and animal farming.
I6	Lack of coherent methods to measure concentrations (differences between state and local ones).
I7	Lack of knowledge about LCA (Life Cycle Assessment) methods used to evaluate potential environmental hazards.

Source: Author's own work.

4   Conclusion

The problem of greenhouse gas emissions to the atmosphere in Poland, which has been persistently growing in recent years, as well as the related intensification of the greenhouse effect, are noticeable and need a strong reaction. The necessity to meet strict requirements is not the only problem that Poland must face, as worse quality of air directly translates into human life and functioning. Immediate actions must be taken. Nevertheless, in order to make sure that the reforms will not have a negative impact on the Polish economy, they must be introduced successively over a lengthy period. It is impossible for Poland to abandon coal-based power within a few years only. Nevertheless, the capacities of coal-based power require gradual replacement with new technologies, including RES. The most reasonable system for implementing such changes assumes 20-25 years of transformations. Therefore, the scenario for the oncoming 25 years should be chosen as soon as practicable (Szczerbowski, 2015; Szczerbowski & Ceran, 2015).

The analysis of the concepts available shows that they are all feasibly, but their implementation may not be easy. For instance, construction of nuclear power plants oftentimes provokes objections of the local people, which in some cases makes the erection of new systems impossible (Olkuski et. al., 2017). The scenario based on renewables is burdened by limitations, too. Leaving aside the legal aspect, introduction of renewable sources of energy induces high capital expenditures on the purchase of expensive technologies. Additionally, high costs are also generated because of the necessity to install higher capacities in a system based on unstable sources, to ensure continues power supply.
The respondents are aware of these barriers. This is why most of them indicated that the 'renewable' and the 'nuclear' scenarios were less likely to be implemented

than the 'coal' scenario. This demonstrates that there are too many factors that prevent the possibility to implement the concepts to reduce greenhouse gas emissions in the power sector. What we definitely need is long-term changes to reshape the mentality of the Poles and reduce economic barriers, which seem to be crucial for the process. The following conclusions were drawn from the study:

1. Each of the concepts to reduce GHG emissions in Poland is feasible, but each has weak points, too:
   - the nuclear scenario oftentimes provokes objections of the local people, which in some cases delays the erection of new systems or makes it impossible at all,
   - the main weak point of the renewable scenario is the legal situation, high capital expenditures and high costs generated by the necessity to perform installations in a system that is based on unstable sources.

2. The respondents are aware of the barriers that hinder the implementation of the GHG reduction scenarios.

3. The majority of respondents indicated that the 'renewable' and the 'nuclear' scenarios were less likely to be implemented than the 'coal' scenario. This demonstrates that there are too many factors that hinder the implementation of the concepts to reduce greenhouse gas emissions in the power sector in Poland.

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RENEWABLE ENERGY SOURCES AND THEIR IMPACT ON POLISH LABOR MARKET IN THE CONTEXT OF GLOBAL ENERGY PROBLEMS

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Abstract

The aim of this article is to analyze potential directions of Renewable Energy Sector (RES) development and its impact on the labor market: assessing job-creating potential of renewable energy sector in Poland. The paper focuses primarily on electricity generation technologies like wind power stations and solid biomass. The comparison between employment level for RES sector and other sectors shows the scale of the impact of renewable energy development on the labor market in Poland and on the country's economy overall. Our findings show that currently, the total number of jobs created because of the development of wind energy (11 500), solid biomass (18 800) and solar energy (2 750) exceeds employment in the coke industry (4 000), cement (6 000) and lignite mines (5 000). According to the author's research, the results of the study indicate that the construction of, for example, wind power plants is not only an opportunity for local communities to create additional employment, but it also provides an opportunity to enrich the community with various types of taxes.

Keywords: *economic effects, labor market, renewable energy, sustainable development economy*

JEL classification: *Q42, Q43, P48*

1   Introduction

Energetics is the key area of industry in most countries of the world in economic, social and political context and, therefore, fuel and energy complex is under the

special supervision of the state while being quite strictly regulated. National security as a whole depends on this complex and its economic constituent elements. The increasing degree of internationalization and globalization of the energy sector and growing energy interdependence between individual countries, confirm the thesis about the countries' inability to ensure their energy security without solving problems of international energy security at regional and global levels with particular emphasis on renewable energy sources.

Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC which imposed on Poland the obligation to increase the share of renewable energy in the final gross energy consumption by the end of 2020. The Directive sets new conditions for the development of renewable energy production and provides a common framework for the promotion of renewable energy sources. At the same time, it establishes mandatory national general objectives in order to create a possibility to achieve 20% share of renewable energy in the gross end-use of energy throughout the EU in 2020. The goal for Poland is to achieve a 15% renewable energy (RES) share of total final energy consumption by 2020. All those actions have a huge impact on both Polish and European labor market in general.

The purpose of the article is to analyze Polish labor market in the context of renewable energy sources development, analyzing the current state and future possibilities, as well as RES impact on regional development based on conducted study, with particular emphasis on data from Kisielice community – the only energy-independent community in Poland.

2   Data and Methods

The analysis in this article is based on the study of literature, the legal regulations and Eurostat's statistics as well as on author's own paper-and-pencil interviews conducted in 2015 among a) RES investors and b) municipalities in which wind power stations are located in Poland, as well as c) in municipalities with outstanding wind conditions but no wind farms established there yet; in order to collect detailed responses and a set of qualitative data.

3   Results of the research

National security depends on ensuring energy security in terms of diversifying not only sources of supply (using a wide range of energy sources) but also suppliers, routes and transport mechanisms. A country's energy system, based on a few

large coal power plants is more susceptible to sabotage than a system based on a dozen scattered low- and medium-power sources. The problems of Polish and EU energy dependence and employment reduction in such industries as mining can be partly solved by developing strong renewable energy sector as well as building credible partnerships with suppliers, transit countries and buyers. International solutions are also needed to reduce global greenhouse gas emissions.

The diversification of electricity sources in the EU countries by energy source is shown in figure 1. According to data presented in figure 1, Poland occupies the third place in terms of using traditional energy sources, such as coal, for electricity production. Poland's power industry has always been based on coal, that is why the largest power units were created near the coal and lignite mines.

Figure 1 **EU breakdown of electricity production by source in 2016**

Source: Author's own calculations based on Eurostat data.

Considering the actual conditions and effects of renewable energy sector development, it is important to take into account, in accordance with the constitutional guiding principles of environmental protection, the principle of sustainable development, economic and social factors that determine the development of a given energy sector. At the same time, we cannot forget about the conditions resulting from the need to protect the environment, including natural and landscape values. Poland's energy industry is faced with the need to modernize and strengthen the National Electricity Grid. Worn-out coal-fired power stations need to be replaced with new production capacity. Some of them will still be based on coal,

which will continue to be the main source of energy in the next few decades, according to "Poland's Energy Policy until 2030" (Ministerstwo Gospodarki, 2009).

3.1 Development of the labor market

The effects of renewable energy industry on the labor market can be observed on the scale of the whole country and the European Union in general. In the European Union, renewable energy sector in 2015 provided employment for 1 139 050 people, including 43 300 people in Poland, where many more people are employed in RES sector per unit of energy produced as opposed to the average in the UE (Table 1). The reason for that might be lower technological sophistication relatively to the leading European countries, for example, in case of Germany – regarding new photovoltaic or wind energy technologies (Graczyk, 2014), or Norway – its electricity generation is 97% renewable and the Norwegian government is planning on increasing sustainable energy use even more (Invest in Norway, 2017)

Table 1 **Energy production and employment in renewable energy sources (RES) sector in Poland and EU in 2016**

Technology	European Union			Poland		
	Energy production (ktoe)	Employment (jobs)	Number of employees per unit of production	Energy production (ktoe)	Employment (jobs)	Number of employees per unit of producton
Hydropower	30053.0	46150	1.54	202.4	1450	7.16
Wind energy	24491.8	332350	13.57	833.0	11500	13.81
Solar PV, CSP and water heaters	9279.8	148050	15.95	4.9	3850	785.71
Solid biomass	7800.9	314700	40.34	776.2	18800	24.22
Biofuels in transport	13239.3	95900	7.24	780.3	6000	7.69
Heat pumps	8607.1	110900	12.88	25.7	750	29.18
All other renewables	8100.4	91000	112.34	77.9	950	12.2
Overall	101572.3	1139050	203.86	2700.4	43300	879.97

Source: Author's own calculations based on EurObserv'ER, 2017b, EurObserv'ER, 2017c.

It can therefore be assumed, that dissemination of renewable energy technologies will result not only in increased employment in absolute terms but also in decreasing employment per unit of production, which means increased productivity, and consequently a decrease in unit costs.

The scale of the phenomenon above depends on the current advancement in the application of the technology. The data presented in table 2 indicates, that for example in the case of solid biomass technology and wind energy, in which Poland has a considerable scale of production and experience, employment per unit of production is already lower than the European average. This means that the Polish experience makes it possible to produce more electricity and heat with lower labor input, which makes Poland's RES competitive and attractive for foreign and domestic investments. Furthermore, calculations from table 2 and predicted data on the electricity production in Poland until 2030, presented in "Poland's energy policy until 2030" in attachment #2 (Ministry of Finance, 2009) obviously prove, that in 2015 Poland had already outperformed the forecasts.

Table 2 **Employment in the sectors of solid biomass (SB), wind energy (WE) and solar energy (SE) in terms of primary energy production in selected EU countries (2015)**

Country	Employment (jobs)			Energy production		
	SB (2015) – direct &indirect	WE (2015) – direct &indirect	SE (2015) – direct &indirect	SB (2015 Mtoe)	WE (2015 TWh)	SE (2015 MWth)
Germany	45400	142900	10600	12.062	79.206	13038
France	50000	22000	5900	9.661	21.249	2059
Sweden	27400	6500	100	9.129	16.268	327
Italy	22000	26000	3000	7.340	14.844	2809
Finland	23700	3300	50	7.901	2.327	37
Poland	18800	11500	2750	6.268	10.858	1413
UK	22300	41100	750	3.824	40.310	492
Spain	15800	22500	4000	5.260	49.325	2586
Austria	15450	5500	2800	4.474	4.840	3655
Portugal	7800	2500	450	2.603	11.608	826
Romania	11100	1100	200	3.521	7.045	136
UE	314700	332350	37300	91.444	301.893	34332

Country	Number of employees per unit of production		
	SB	WE	SE
Germany	3763.88	1804.15	0.81
France	5175.44	1035.34	2.86
Sweden	3001.42	399.55	0.30
Italy	2997.27	1751.54	1.07
Finland	2999.62	1418.13	1.35
Poland	2999.36	1059.12	1.94
UK	5831.58	1019.59	1.52
Spain	3003.80	456.15	1.55
Austria	3453.28	1136.36	0.77
Portugal	2996.54	215.36	0.54
Romania	3152.51	156.13	1.48
UE	3441.45	1100.88	1.09

Source: Author's own work based on: EurObserv'ER, 2017, EurObserv'ER, 2017a.

The worldwide renewable energy sector in 2016 employed 9.8 million people, directly and indirectly (with a 1.1% increase in 2016 over 2015). The most consistent increase has come from jobs in the solar PV and wind categories; it has more than doubled since 2012. In contrast, employment in solar heating and cooling and large hydropowers has declined. These employment trends can be attributed to several underlying factors. Falling costs and supportive policies in several countries, for instance, have spurred deployment of renewables at a record pace, and have resulted in job creation. However, these positive changes were moderated by lower investments, rising automation and policy changes, resulting in job losses in some major markets, including Brazil, Japan, Germany and France (International Renewable Agency, 2017)

The shape of the EU climate and energy policy clearly indicates the need to further increase the share of RES in the national energy mix. However, the dynamics of change, the specific value of the national RES target for 2030 and the contribution of wind energy to its fulfillment still depend on future political decisions. Therefore, the potential impact of wind energy on the Polish labor market until 2030, based for example on the study "Impact of wind energy on the Polish labor market" (Bukowski, Śniegocki, 2015) was determined on the basis of a scenario analysis, where three development scenarios of the sector in Poland: central, low and high were analyzed. It was assumed that, during 2018-2030,

investments in onshore wind farms will be as follows: 400 MW/year in central scenario, 200 MW/year in low scenario, and 600 MW/year in large scenario. It should be stressed that the re-acceleration of the development of wind energy sector is a prerequisite for the realization by Poland a binding target for the development of RES till 2020. Therefore, the realization of a low scenario means not only Poland's losing the development impetus for wind energy, but also a high risk of incurring the costs of failing to comply with the provisions of the EU climate change package.

Polish RES sector reforms, introduced by the Renewable Energy Sources Act 2015 (the 'RES Act'), which came into force on 1 July 2016 marked a significant step forward, however, subsequent amendments to the RES Act have illustrated that the Polish government is in a difficult position of striking a balance between developing RES for energy diversification and rescuing its coal industry. It is estimated (Pacula, 2017) that around 80% of Polish coal mines (mainly concentrated in the south-west region of Silesia) are unprofitable, the sector employs around 104000 people, with another 208000 people on miners' pensions. Poland has Europe's largest hard coal reserves, thermal coal and lignite accounted for 84% of the country's electricity generation in 2015 (Easton, 2016). Despite governmental subsidies, Poland's coal mining industry debts are still huge (Wood & Broom, 2017).

It is to be expected that despite the increased productivity of the industry, wind energy in Poland will generate more jobs per unit of energy than coal energy sector in subsequent decades, especially after employment restructuring in hard coal mining. According to author's survey, wind energy installations are usually locally oriented, in which case there is no need to build a centralized technical infrastructure. However, taking into account that RES creates jobs geographically more dispersed than conventional power stations, because it depends on the resources' location (González & Vélez, 2009), and the fact that it has higher rates of employment per MW installed than conventional energy (Rodríguez-Huertaa, Rosas-Casalsa, Alevgul and Sormanc 2017, p.557). It can be concluded that wind energy can successfully become a stimulating factor for economic development at the regional level.

The use of wind energy at the local level brings both economic and social benefits. One of the most important economic benefits is creating a strong impulse for local development resulting from the increase of local entrepreneurship, and hence an increase in the number of jobs. Unfortunately, this fact is not always obvious in various communes.

On the Polish labor market, the number of job offers related to wind energy is constantly growing. Specialists are being sought in the field of wind turbines

construction, there is a need for designers, assemblers, operators, service and maintenance technicians, environmental managers as well as experts in business development related to wind energy and investment advisors. Although the generated jobs are related to various activities during investment cycle, the largest number of jobs are created during the construction and installation phases.

The construction of wind farms in the communities may also constitute an additional source of income. The results of the study indicate that the construction of wind farms is not only an opportunity for the local community for additional employment, but it is also an opportunity to enrich the commune in the form of various types of taxes. In addition, the use of renewable energy is a strong support for communes and districts during their efforts to obtain external sources of financing from various types of EU funds as well as private investors for the implementation of investments in infrastructure owned by them.

Due to the significant depreciation of existing infrastructure in public utilities, these investments will have to be carried out anyway. Therefore, the development of wind energy sector can bring significant savings in planned investments and additionally boost local budgets. Inflows to municipalities where wind turbines have been located, in areas with favorable wind conditions, can account for up to 17-22% of the municipal budget. Furthermore, according to the author's research (Wasiuta, 2014) – more than 96% of analyzed communities consider tax revenues to the municipal budget and job creation potential to be the biggest benefits of RES development for the municipalities. That is why many municipalities "off-bottom" are seeking to put wind farms on their premises, and local governments are waiting for potential investors with open arms. The construction of a wind farms is often not only the aforementioned budget revenues, but also often an improvement, at the expense of investors, of the road network –57% of analyzed communes consider this factor to be important. Not only the main roads and intersections, but also the construction of a network of roads in the fields between windmills, which farmers use willingly later on (Wasiuta, 2014)

Comparing employment level for RES sector with other sectors shows the scale of the impact of renewable energy development on the labor market in Poland and on the country's economy overall. Currently, the total number of jobs (table 2) created because of the development of wind energy (11 500), solid biomass (18 800) and solar energy (2 750) exceeds employment in the coke industry (4 000), cement (6 000) and lignite mines (5 000). In 2030 wind energy might create more jobs than coal mining which, after the inevitable restructuring (according to Warsaw Institute of Economic Studies (Bukowski & Śniegocki, 2015)) will employ about 4 to 16 thousand people. In contrast to the mining industry, the long-term perspectives arise from factors, which are beyond national control (for

example the situation on the global coal market, the ban on unprofitable mines in the EU and other). Moreover, as EU27 statistics show, coal reduced its share in the total primary energy supply from 22% in 1995 to 16% in 2009 (Markandya, Arto, González-Eguino, Romá, 2016, p. 1344)

The development of wind energy sector will depend largely on the shape of the regulations concerning renewable energy auctions introduced in Poland. It is worth noticing, that jobs that are dependent on wind energy sector are not concentrated in large industrial plants, and therefore less visible than employment in traditional heavy industry and mining. It should also be taken into account that rising automation in extraction, overcapacity, industry consolidation, regional shifts, and the substitution of coal by natural gas in the power sector result in job losses in the fossil-fuel sector in some countries. Poland has two options in this sector – either to invest in the mining sector (for example in new technologies) to increase efficiency and reduce costs, in order to be competitive on local and international markets – which would lead to a reduction in the number of employees or to continuously subsidize the mining industry in order to artificially sustain the sector and its employment (Wasiuta, 2014, p.150). Moreover, climate policies and the rise of renewable energy usage may add pressure on the sector. In some power markets, the increased integration of variable renewable energy in the grid is already creating financial issues for incumbent fossil fuel based generators (IRENA, 2017).

For example, employment in the coal industry worldwide is decreasing due to several factors such as power plants closing, overcapacity and improved mining technologies. China, for example, produces nearly half the world's coal, but excess supply and a slowing economy have led the government to plan of closing 5600 mines (Stanway, 2017) as well as cancelling plans to build more than 100 new coal-fired power plants (Forsythe, 2017) which can lead to the loss of 1.3 million coal mining jobs, which equals 20% of the total workforce in the Chinese coal sector (Yan, 2017). The Chinese government intends to spend more than $360 billion through 2020 on renewable power sources and to increase employment in this sector to 13 mln. people (Total Investment In Renewable Energy Will Reach 2.5 Trillion Yuan, 2017).

The solar energy sector in Poland is one of the few exceptions with a rising statistics. According to the data presented in table 2, Polish solar industry employs 2 750 people and generates a turnover of 230 million euros.

In the times of frequent protests organized by local community members against the construction of wind turbines it is worth looking at places where wind farms coexist with the residents. For example the Kisielice community (*Gmina Kisielice*) in Poland is an interesting illustration of such situation. The local

authorities have found a way for a modern, ecological direction of change while ensuring a continuous flow of financial resources, also being the first and only energy self-sufficient community in Poland. Wind energy has been implemented there consequently since the late 1990s. The local community is happy, farmers are happy when their land is chosen for an investment, because they get a fair salary. In addition, the protection of the environment is a positive aspect for everyone while using RES sources. Projects aimed at using biomass and cogeneration for heating in the community have been implemented since 2003, led to the closure of coal-fired boiler houses, coal and oil heating systems in detached houses are being abolished successively. According to the author's research (Wasiuta, 2013) – 80% of respondents consider it to be significant or moderately significant that the development of renewable energy will contribute to regional development in the forms of self-employment and increasing jobs in that region which contribute to the development of different economic sectors, the development of transport infrastructure.

4   Conclusion

Renewable energy sources sector creates diverse jobs in production, services and construction, requiring a variety of qualification and skills. Its development not only increases but also improves the quality of jobs in the industry. The slowdown in the development of second biggest Polish RES sector, which is wind energy sector resulted from regulatory uncertainty when working on a law on renewable energy sources has led to a reduction in the scale of the related employment by 3.5 thousand people (Bukowski & Śniegocki, 2015) in 2012-2014. Due to the unfavorable regulatory environment, this trend will probably continue over the next few years.

Increase in employment requires a new impetus of investments. In the next decade, the dynamics of jobs created for example by wind energy sector, will be determined primarily by the size of expenditures for the construction of offshore wind farms.

Dissemination of any renewable energy technology will result in an increase in employment in absolute terms, but the decrease in employment per unit of production. Employment in relation to installed capacity in Poland is higher than the average in the EU (table 1). There is considerable potential for growth in revenues from renewable energy production (for example from income tax) and increasing employment in this sector.

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International Scientific Days 2018.
„Towards Productive, Sustainable and Resilient
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