University of Economics in Bratislava

Faculty of Business Economics with seat in Košice

ACTA OECONOMICA CASSOVIENSIA

Scientific journal

ISSN 1337-6020

Vol. X, 2017
No. 2

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The grammar and language style of papers is not reviewed and corrected.

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Ministry of Culture reg. Nr.: 3239/09

ISSN 1337-6020

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SURVEY AND RESEARCH STUDIES

EVALUATION OF REGIONAL INNOVATION SUPPORT – ANALYSIS OF RESEARCH AND DEVELOPMENT ASSISTANCE IN COMPANIES

Michal ČEPKO – Valéria NÉMETHOVÁ

Abstract
Innovations represent essential pillar of the development of regions, so it is important to constantly support them. The issue of support is also strongly monitored by transnational groupings of development aid where a significant proportion of help is devoted to innovation. The aim of the present article is to examine the impact of the European Union's support for innovation. Subsidies for companies in the Czech Republic will be analyzed. Using the basic analysis of Difference-in-Differences, a similar phenomenon can be observed as empirical literature shows - although positive effects of support are present, the beneficial impact can be observed only in the short term, long-term effects are absent. Therefore, it is important to address recommendations for supportive policy makers to eliminate this problem, as sustainable development is one of the main objectives of the transnational grouping.

Keywords:
evaluation, innovation, support, Difference-in-differences, European Union regional policy

Introduction

Innovations are an important factor in business success. It has long been recognized by political representatives of national states as well as in multinational groupings. For this reason, increased attention is paid to the support of research and development in the whole society which is reflected in a huge amount of finance to development support. Investing in research and development is the subject of discussions both on the political scene of Slovakia and in Europe. It turns out that investing in companies brings a number of unexplained problems. Because of this, the implemented support needs to be constantly monitored and systematically carried out the evaluation of aid invested.

The foundation of this evaluation culture has already laid since the existence of structural funds in Europe. In some countries it has a longer tradition. It is gradually developing in all member states of the European Union, which consists of constant monitoring and evaluation of the use of development finance. These evaluation studies investigate the implementation of the so called evaluation criteria, namely sustainability, efficiency, effectiveness but also other aspects of assistance. Efficiency studies (BIS, 2009; TIG, 2003) in Europe, both in the world and in Slovakia, are investigating for example deadweight effect, which indicates that the aid was essentially unnecessary since the investment would have been realized without the assistance provided.

Another phenomenon is the so-called a substitution effect, which means inefficient substitution of own funds of public support recipients (BIS, 2009). With regard to the aspect of effectiveness, studies suggest that the support may have short-term and long-term effects (Rodriguez-Pose and Fratesi, 2004). In

some cases, zero- and negative effects may occur by the support realization, but generally a positive shift is expected. For the measurement of effectiveness, the so-called counterfactual models are used that originate in chemistry. These models compare identical groups of supported and the control sample made up by unsupported entities. (Inforegio, 2010, Reinkowski et al., 2010, Evalsed, 2013b). These models help us to better understand the support mechanism and to assess more objectively whether the support has been effective in the long term or this shift is only short run.

1. Material and Methods

In the presented research projects of entrepreneurial entities in the Czech Republic are analyzed that have received support under the 2007-2013 programming period, namely the OPPI program which means simply innovation support. The data were obtained from the CzechInvest database, which is a state contributory organization, subordinated to the Ministry of Industry and Trade of the Czech Republic. It aims to strengthen the competitiveness of the Czech economy by supporting small and medium-sized enterprises. These data are published within the meaning of Article 7, Article 2 d), Commission Regulation (EC) No 1828/2006, which gives the OP Managing Authority responsibility for publishing the list of beneficiaries together with other information such as the amount of support, the name of the project, etc. This information is published by the company on its czechinvest.org website. The collected published information of selected businesses was subsequently supplemented by a measurable indicator - sales.[1] This indicator was selected because represents the cumulative amount of money that the economic entity has received from its operational and economic activity over a certain accounting period. Sales are equally important inputs for almost all calculations of the economic entity's profitability ratios. Statistics were obtained by reading off the financial statements, which Czech business entities are required to publish and can be accessed on the website of justice.cz, which is under the auspices of the Ministry of Justice of the Czech Republic. The data were collected for years 2004 to 2014, because it also has to be considered that the approval and subsequent implementation of the particular call for support was at the end of 2007 and therefore the effect of the implementation of the aid could only be reflected in later years. This choice will also strengthen our compliance with one of the most important objectives of European regional policy - sustainability of development. For this reason, the decade was divided into three parts, the period 2004-2008, 2008 -2010 and the last period 2010-2012. In practice, this means that we have accumulated data of the supported projects on a single list, given that a total of 1270 projects have been supported under the program. Since the collection of necessary indicators from the financial statements of each small and medium-sized enterprise was extremely time consuming, analyzed will be the companies supported under the first call for

[1] However, this indicator might be influenced also by other factors that has to be examined in further research.

support (Výzva I – Call I). The number of supported projects was quantified and its descriptive statistics in terms of legal forms and amount of support. After obtaining all the necessary items from the financial statements of the supported companies under the Call I, we subsequently compared the individual sales for the three periods before, during and after the support provided to the companies. In this process, we later used the basic level of Difference in Differences method (Evalsed, 2013), but only partly because we were unable to obtain any database of unsupported business entities to compare the unsupported group. Out of the total of 78 supported projects under Call I, were collected the data from 48 companies for the entire timeframe for 2004 to 2014. The final step of the evaluation was the application of the basic level of Difference-in-Difference method in the two monitored periods. This was the period from 2004 to 2012 and the period 2006 to 2010. Both periods were divided into two intervals, with the break year 2008. The next step of the analysis was to calculate the difference between the values of the observed period.

2. Results and Discussion

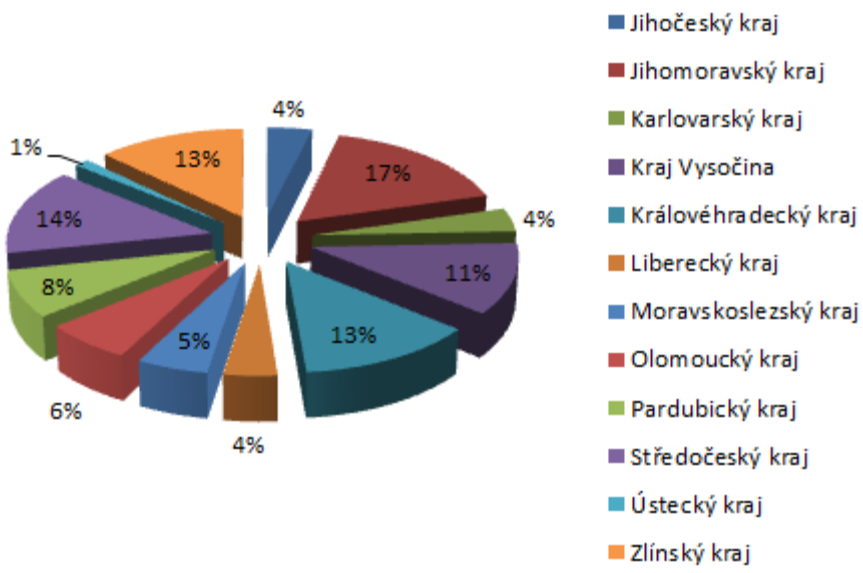
In the following section are discussed the regional and financial dimensions of support, analyzed the number of projects that were supported in individual regions in the priority axis of Innovation within the OPPI program in the Czech Republic, respectively the success of individual companies in terms of their legal form, their regional allocation and other aspects. At the end is the basic level of Difference-in-differences method applied to analyze a measurable sales indicator.

2.1 Descriptive Statistics and Regional Dimension of Innovation Support

The OPPI program aims to increase the competitiveness of selected sectors of industry and business to increase the attractiveness of the Czech Republic itself and its individual regions. Particularly it supports innovation, accelerates the introduction of new technologies that have emerged from research into production. This aid is promoting entrepreneurial spirit, increasing demand for new and better products and services. During the period 2007-2013, OPPI program under its priority axis - Innovation, a total of 1269 projects were approved and supported in all four calls made during this time period, with Call I being launched on April, 25th in 2007, Call II was launched on May, 1st in 2008, Call III on March, 2nd in 2009 and the last Call IV was announced on February, 1st in 2010. In terms of the legal form were the selected businesses divided into categories.

The largest number of supported projects are limited-liability enterprises with a total of 52 projects. Joint-stock companies with their 23 supported projects are the second most supported legal forms of businesses. Natural persons according to the Trades Licensing Act registered in the Commercial Register are presented with two supported projects and one supported project was contracted for a collective farm.

For the analysis of the regional dimension, we determined the region in which the program was implemented and not the county seat of the company as a criterion for the division of regions. Except for the fact that we have included Prague in the Central Bohemia Region, the remaining regions are identical to the political-geographic division of the Czech Republic. In this call, the most supported projects were the South Moravian Region with 13 supported projects, followed by the region with the highest number of supported projects under all the calls, namely the Central Bohemian Region with 11 supported projects. A large number of supported projects under Call I were also provided by the Hradec Králové Region together with the Zlín Region, which had 10 supported projects. The lowest number was achieved by the Ústecká Region, which had only one supported ceramics project for the whole Call. The remaining shares in terms of regional breakdown of individual regions in percentage terms are listed in the graph below.



Graph 1 : Percentage of regions according to the number of supported projects

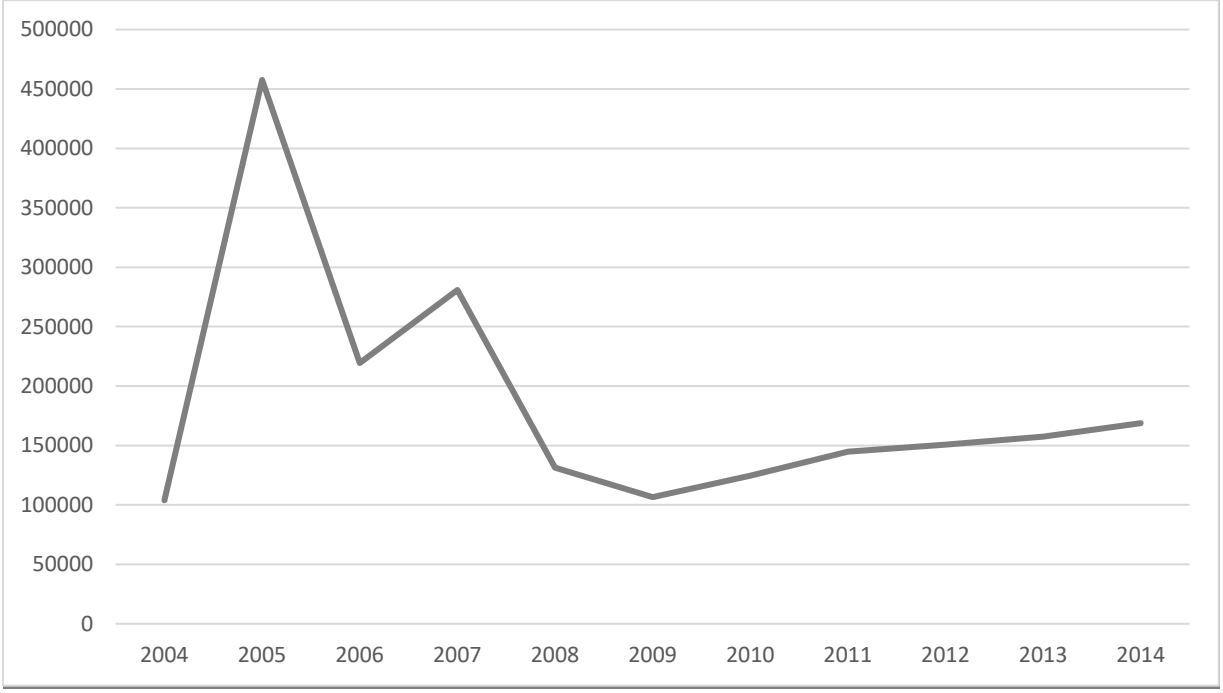
Source: Own calculations

Getting aid from European Union funds has its rules and a general scheme. The first Call under the Innovation Program was funded by 40 mil. Eur. The most supported project was the MARLENKA International implemented in the Moravian-Silesian Region aimed at innovation of an automatic line with an amount of € 2 775 516 and the least supported was the project of ELLA-CS, which was able to receive € 45,000 in support of the process of manufacturing atraumatic stitches. This project was implemented in the Hradec Králové Region. In the first call was allocated amount € 26,138,443 for Ltd. companies, which accounted for 64% of the total support of Call I. Followed by joint stock companies with a total of € 13,892,458 and a share 34%. With an oscillating rate around 1%, natural persons got a total of € 488,121 and collective farms € 351,565.

b. Evaluation of the measurable sales indicator

In this part of the presented research we are dealing with the research question whether the implementation of the support to the enterprises that benefited from the subsidies under the Innovation program has led to a positive change in sales in analyzed companies. This positive shift is explored in sales in the individual years of implementation but especially in the years following the implementation of the monitored period 2004 to 2014. Decisive role have the years 2008 - the year of implementation of aid and the last years 2010 and 2011.

We will carry out the first analysis and evaluation in absolute numerical value of the sum of sales in our sample of selected enterprises under Call I. Overall, we have totally evaluated 48 companies. In our base year 2007 prior to implementation of the aid, was the total amount of business sales of € 509,345,015. This value is then compared with 2008 when Call I was launched. There can be seen already a decrease in the value of sales to € 238,338,354. The decline in sales continue to 2009, reaching € 193,439,420. However, as we are particularly interested in sustainability of support, we take into account especially years 2010 and 2011. In these years, sales have grown over the first year of implementation. In 2010 it was € 225,719,932 and in 2011 it was slightly higher at € 262,713,604. We can note that from 2008 to 2009 there was a slight decrease in sales by € 44,898,934. This may mean that businesses during the early years of support have correctly implemented this aid and transformed them into sales growth since 2010, which continued until the end of our 2014 monitoring period. The process of development, implementation, marketing and market upgrading of innovative products or procedures can be the question of several years. For completeness of descriptive statistics, we also looked at average sales figures, which correspond to the absolute amount of sales achieved in the above years. The development of these values is also presented in the graph below.



Graph. 2 : Average sales growth

Source: Own calculations.

The period 2007 and 2008 is characterized by a decrease in the total sum of sales of all companies by 53.21%. The period of approval of aid in 2008 and subsequent implementation in 2009 is characterized by a similar trend of development, i.e. by a further decline in sales by -18.84%. It is in 2010 that the effects and impacts of innovation support in business occur. In this period we see an increase in sales volume of 16.9%, which to some extent confirms our assumption. A similar trend has been maintained in the coming years. In 2011 sales increased by 16.39% compared to 2010, the percentage increase was further down by 4.06%, 4.49% and 7.07% between 2011 and 2014. After collecting and initial analysis of input data with their relation to absolute figures for sales volume, average values, and percentage changes in sales volume between two consecutive years, we will be dealing with a separate, partial analysis of the Difference-in-Differences.

For this analysis, were divided two periods for years 2004 to 2012 and the period from 2006 to 2010. For the first period from 2004 to 2012, the years 2004, 2008 and 2012 are important. These years therefore create two intervals within this period for comparison between 2004-2008 and 2008-2012. The following table shows the comparison of the aforementioned periods.

Table 1: Table of DiD

DiD Estimate	Difference in Sales		Difference between periods
	2004-2008	**2008-2012**	
Supported firms	26,48	14,71	-11,77
DiD Estimate	Difference in Sales		Difference between periods
	2006-2008	**2008-2010**	
Supported firms	-40,07	-5,29	34,77

Source: Own calculations.

The change in sales in the 2004-2008 period represents increase of 26.48% compared to 14.71% change in the period 2008-2012. The difference between these periods is therefore 11.77%. For the period 2006 - 2008, we obtain a decrease in sales of -40.07%, for the period 2008-2010 similarly 34.77%, which again confirms the positive effect of support for sales of supported companies.

Conclusion

In the present research, we have evaluated individual years of aid with achieved levels of sales in companies supported under Call I of the OPPI innovation program in the Czech Republic. We have identified the span of years under review as the decade 2004-2014. The year 2008 was the year in which projects were approved. Subsequently, we assume in the methodology of this study that the effects of the support will come after a few years of the year of approval. It is because the implementation of support and the development of innovated products is not a matter of days.

By tracking the growth of sales, the assumption that the implementation of the aid would not have its measurable effect immediately after implementation was correct. Also in terms of this indicator as sales in 2008 and 2009 were lower than in 2007, the last year before the introduction of support. Sales growth started in 2010 which is confirmed by the fact that the aid itself was important. The positive effects of the aid have probably begun to show up to two years from the actual approval of the aid and its subsequent implementation to the supported enterprises under Call I. However, it is not excluded that another factor has helped to this impact which will be explored in future research of this topic. Subsequently, the aid effect was accompanied by an increase in sales of supported enterprises, which was most pronounced in the two following years 2010 and 2011. After these years, sales slightly decreased, but compared to the period just after approval of the aid and its initial implementation, we can see that sales are higher in all subsequent years of the monitored period. By applying the basic level of the difference in differences analysis in a period without support, the gap between periods is therefore 11.77% difference in growth rate.

After summarizing all the findings, we can conclude that overall, the aid was likely to have helped to increase the level of sales, but only in the short term. This is justified by the fact that the projects were designed primarily to comply with the approval procedure. In connection with approval, projects had to correspond

to pre-defined conditions that respect the principle of sustainable economic development.

Based on the results, we can claim that the role of economic development through the analyzed support has been achieved. However, it cannot be said that this growth is also sustainable. It would be appropriate to take conditions that would more rigorously assess the projects submitted for approval in terms of sustainability of development. In addition, to tightened project appraisal in this respect, it would be suitable to better control the implementation of the project itself until its last phase and to ensure that all the predefined attributes of the project are respected.

Empirical research of support, however, is not over. The next step will be to expand research into other businesses within the support program. It will also be important to monitor the effects of support over the coming years in order to better examine the long-term effects of support. Since research and development are the cornerstones of development and companies its engines, it will be important to address this issue also in the following years of providing support from this transnational grouping.

Acknowledgments

This work was supported by the Slovak Research and Development Agency VEGA under the contract number 1/0098/15.

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THE EVALUATION OF SLOVAK AND POLISH SKI RESORTS USING THE MUTI-CRITERIA DECISION ANALYSIS

Jana CORONIČOVÁ HURAJOVÁ

Abstract
In this paper we deal with the usage of multi-criteria decision analysis in the process concerning the evaluation ten ski resorts in Slovakia and Poland. We rank the 10 best Slovak and Polish ski resorts according to six selected criteria. In order to obtain the best results describing the real situation we use three methods to determine the weighs of the criteria and subsequently we use each of the weights for method TOPSIS to rank the ski resorts.

Keywords:
multi-criteria decision, entropy, SAATY, topsis, ski resort

Introduction

Decision-making is the study of identifying and choosing alternatives to find the best solution based on different factors and considering the decision-makers' expectations. Every decision is made within a decision environment, which is defined as the collection of information, alternatives, values and preferences available at the time when the decision must be made. The difficult point in decision-making is the multiplicity of the criteria set for judging the alternatives.

One of the sectors that have a significant impact on the GDP of the country is tourism. Tourism is a rapidly evolving sector especially because of the removal of the obstacles to the travel. Thanks to its rugged relief, Slovakia is one of the countries that have the opportunity to build natural ski resorts. In this paper we use multi-criteria decision analysis to rank ten ski resorts, five of them in Slovakia and the other five in Poland.

1 Methodology

When trying to rank the given ski resorts we encounter a decision-making problem where the optimal decision must meet more than one criterion. The criteria don't have to be of the same type, they can be maximized or minimized. Before the evaluation, it is appropriate to convert all criteria to either maximized or minimized. The evaluation consists of two steps:

- to determine the weights of the criteria by which the objects are evaluated,
- to rank the objects according to the sum of the points obtained on the basis of the individual criteria.

The weighting of criteria can be determined in different ways. It depends on whether or not we are able to determine preferences. If we are not, all criteria have the same weight, for example if we have 5 criteria; each criterion has a weight of 1: 5 = 0.2. It is also important to remember whether we work with ordinal or cardinal information. If we work with cardinal information, as in this case, Saaty's

method (Saaty, 1990) and entropy are the two of the most used methods. Saaty's method can be summarized in the following three steps:

1. to compare all criteria by pair and determine which criterion of this pair is more relevant and how much, that is, the degree of preference.
2. to create a pairwise comparison matrix $S=(s_{ij})$, where s_{ij} represents the importance of the *i*th criterion to *j*th criterion. If $s_{ij}>1$ then *i*th criterion is more important than the *j*th criterion, while if $s_{ij}<1$then the *i*th criterion is less important than the *j*th criterion. If two criteria have the same importance, then the entry s_{ij} is 1. Obviously, $s_{ii}=1$ for all i.
3. The weights w_i, i=1,2,..., n of the given criteria are determined as follows

$$w_i = \frac{\left(\prod_{j=1}^{n} s_{ij}\right)^{\frac{1}{n}}}{\sum_{k=1}^{n}\left(\prod_{j=1}^{n} s_{kj}\right)^{\frac{1}{n}}}; i = 1, 2, \dots, n.$$

In the case of entropy, we do not need to know the criteria preferences. We take a matrix $Y=(y_{ij})$, where the rows of Y correspond to the variants and the columns of Y correspond to the criteria.Subsequently we transform the matrix Y to the matrix $P=(p_{ij})$, where

$$p_{ij} = \frac{y_{ij}}{\sum_{i=1}^{m} y_{ij}}; \quad i = 1, 2, \dots, n, j = 1, 2, \dots, m.$$

For each criterion we compute its entropy:

$$E_j = -\frac{1}{\ln m}\sum_{i=1}^{m} p_{ij}\, ln\, p_{ij}\,;\ j = 1, 2, \dots, m.$$

From the numbers Ej we obtain Dj as Dj = 1-Ej and finally we get the normalized weights of the criteria as

$$w_j = \frac{D_j}{\sum_{j=1}^{n} D_j}.$$

The next step in this evaluation process is to rank the objects based on the chosen criteria. We have a choice of several methods suitable for working with cardinal information. In this paper we use the TOPSIS method (Hwang et al., 1981; Lai et al., 1994). This method uses cardinal information to find the compromise variant that is closest to the ideal variation and as far from the basal variant and that is precisely the purpose of this test. The ideal variant gets the best values with respect to all the criteria and is represented by the vector $h=(h_1, h_2, ..., h_n)$. On the other hand, the basal variant achieves the worst possible values in all criteria, represented by the vector $d=(d_1, d_2, ..., d_n)$, where n expresses the number of criteria we take into account in the analysis.

We can describe the TOPSIS method in the following steps:

1. to create the evaluation matrix $Y=(y_{ij})$, where the elements of the matrix y_{ij} correspond to the evaluation of the i-th variant according to the j-th criterion.
2. To create a normalized matrix R=(rij), where

$$r_{ij} = \frac{y_{ij}}{\sqrt{\sum_{i=1}^{m} y_{ij}^2}}; i = 1, 2, \dots, m; j = 1, 2, \dots, n.$$

3. To create a matrix Z=(zij), where

$$z_{ij} = w_j r_{ij};\ \ i = 1, 2, \dots, m;\ j = 1, 2, \dots, n.$$

4. To find the ideal variant $h=(h_1,h_2,...,h_n)$ and basal variant $d=(d_1,d_2,...,d_n)$:

$$h_j = \max_i z_{ij}\,; j = 1, 2, \dots, n$$

$$d_j = \min_i z_{ij}\,; j = 1, 2, \dots, n$$

5. To compute distance indicator c_i as

$$d_i^+ = \sqrt{\sum_{j=1}^{m} \left(z_{ij} - h_j\right)^2}\,; i = 1, 2, \dots, m$$

$$d_i^- = \sqrt{\sum_{j=1}^{m} \left(z_{ij} - d_j\right)^2}\,; i = 1, 2, \dots, m$$

$$c_i = \frac{d_i^-}{d_i^+ + d_i^-}; i = 1, 2, \dots, m$$

6. Finally, rank the variants according to the values of these indicators (the best variant has the maximum value).

2 Results

To evaluate the given ski resorts we consider the following six criteria:

- K1 – total length of slopes,
- K2 – ticket price (adult +child),
- K3 – lifts,
- K4 – chairlifts,
- K5 – height above sea level – with an increasing altitude, the average

temperature drops and the number of days when the conditions are suitable for skiing, the higher the altitude, the higher the condition of the favorable ski conditions,

- K6 – total capacity/hour.

All criteria except of K2 are maximized, the higher the value, the better, therefore we modify the values of K2 to be maximized (see table 2). To be able to compare the objects we assign the points to the ski resorts according to the height above sea level (see table 3). The input data correspond to the spring holiday season this year and are listed in the table 4.

To determinate the weights of the given criteria we use two most used methods, namely Saaty and entropy. We also consider a case where all criteria are having the same weights equal to 1/6. Gradually, we use all this three cases and use the method TOPSIS to rang the ski resorts to which of the ski resorts is the best based on the chosen criteria.

The resulting order is shown in the table 6.The ski resort that best meets our criteria is Jasná (SR). On the second place there is a Ski resort Szczyrk (PL) follows by Donovaly (SR), Vrátna (SR), Kotelnica Białczańska (PL), Jaworzyna Krynicka (PL), Ski resort Szklarska Poręba (PL), Zakopané-Kasprowy Wierch (PL), Tatranská Lomnica (SR) and Veľká Rača – Oščadnica (SR).

Table 1 Evaluated ski resorts

A	Donovaly	F	Ski resort Szklarska Poręba
B	Jasná	G	Tatranská Lomnica
C	Jaworzyna Krynicka	H	Veľká Rača - Oščadnica
D	Kotelnica Białczańska	I	Vrátna
E	Ski resort Szczyrk	J	Zakopané-Kasprowy Wierch

Source: own processing

Table 2 Criterium K2 - price

Ski resort	Adult	Child	Sum	Difference	Final value
A	26	18	88	-44	44
B	39	27	132	0	0
C	26	20	92	-40	40
D	23	22	90	-42	42
E	20	14	68	-64	64
F	22	13	70	-62	62
G	35	25	120	-12	12
H	26	22	96	-36	36
I	25	18	86	-46	46
J	30	23	106	-26	26
max value			132		

Source: own processing

Table 3 Criterium K5- height above sea level

Ski resort	Min	Max	Difference /100 =D	Points P	Product DxP	Height above sea level	Points
A	910	1361	4,51	1,5	6,765	(0,750>	1
B	900	2024	11,24	1,5	16,86	(750,1000>	1,5
C	644	1114	4,7	1	4,7	(1000,∞)	2
D	680	910	2,3	1	2,3		
E	524	1257	7,33	1	7,33		
F	707	1362	6,55	1	6,55		
G	805	2196	13,91	1,5	20,865		
H	630	1050	4,2	1	4,2		
I	600	1709	11,09	1	11,09		
J	1014	1987	9,73	2	19,46		

Source: own processing

Table 4 Input data

Ski resort	K1	K2	K3	K4	K5	K6
A	11	44	14	3	6,77	14100
B	45	0	15	13	16,86	32500
C	8,4	40	3	9	4,70	14000
D	16,3	42	9	9	2,30	8200
E	34,6	64	3	16	7,33	5500
F	15	62	3	5	6,55	2600
G	9,1	12	3	4	20,87	3765
H	14	36	3	3	4,20	9700
I	12	46	14	2	11,09	10500
J	15	26	0	4	19,46	10000

Source: own processing

Table 5 The method TOPSIS for equal values, Saaty and entropy

	Rank			
Ski resort	**Equal values**	**Saaty**	**Entropy**	**Average value**
Donovaly	3	6	2	3,6667
Jasná	1	1	1	1,0000
Jaworzyna Krynicka	7	7	6	6,6667
Kotelnica Białczańska	5	4	5	4,6667
Ski resort Szczyrk	2	2	4	2,6667
Ski resort Szklarska Poręba	8	3	9	6,6667
Tatranská Lomnica	9	10	7	8,6667
Veľká Rača - Oščadnica	10	8	10	9,3333
Vrátna	4	5	3	4,0000
Zakopané-Kasprowy Wierch	6	9	8	7,6667

Source: own processing

Table 6 The ranking of the ski resorts

Rank	Name	Rank	Name
1	Jasná	6	Jaworzyna Krynicka
2	Ski resort Szczyrk	6	Ski resort Szklarska Poręba
3	Donovaly	8	Zakopané-Kasprowy Wierch
4	Vrátna	9	Tatranská Lomnica
5	Kotelnica Białczańska	10	Veľká Rača - Oščadnica

Source: own processing

Conclusion

Every day we meet situations when we have to decide for something, and usually our decisions have to meet a number of conditions. In such a situation we use multi-criteria decision analysis.

The choosing an appropriate ski resort depends on many factors as well and the result can provide important information to both the customer (ski, snowboard) as well as to the operators of the ski resorts. As the main criterion of choice we can take how much we are willing to spend money on skiing, the variety and number of ski slopes or how long we are willing to wait for the lift.

In this paper we try to compare and rang the ten different ski resorts based on selected criteria that are important to us and to select the best approaching ideal option. In Slovakia, the best ski resort is Jasná followed by ski resorts Donovaly and Vrátna. In Poland is on the first place Ski resort Szczyrk followed by Kotelnica Białczańska and Jaworzyna Krynicka.

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INNOVATION PROCESSES AND THEIR INFORMATIONAL PROVISION

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Abstract
Information and communication technologies are designed to overcome majority of barriers and resolve issues connected with implementing innovations in businesses. Moreover, there are further technical and technological tools that are also helpful at overcoming various barriers to creating innovations. The bad news is that acquiring some technologies involves extremely high investments that personnel training are arduous and often prolonged and that salaries to be paid to qualified specialists, users of these technologies, are dirty high. Falling into the category are, for example: Technologies for reverse engineering; Cutting-edge microscopic devices and devices for analysing various materials; Devices for building prototypes; Technologies for intricate geometric measuring systems with 3D parameters; Diagnostic units for testing manipulation and control devices; Robotic devices for testing functions of products being developed, etc.

Keywords:
innovations, virtual engineering, simulation, miniaturization, technological preparation of production

Introduction

Tools and methods used at modelling and designing products are immense and multifaceted and are employed with any processes. They allow on-line visualisation, digitalisation and consequent engineering. Recent manufacture of whichever product requires virtual engineering, networked on-line interconnection of the most intelligent production processes and simultaneous research and development. These elements may be helpful in producing the trendiest products that feature their own artificial intelligence; at a time, they present the road to be shortly taken by all manufacturing companies. A significant element in proceeding of the economy is boosting efficacy through activating of the human potential and utilisation of knowledge managing

1 Computer support of manufacturing processes

Virtual engineering makes possible to construe, analyse and remodel already built prototypes directly in the electronic form in any computer and with the aim to introduce total product digitalisation, tight production process optimisation and utilisation of all available means in real-life environment. Used today to simulate manufacturing processes are various SW tools that are highly advantageous e.g. in that that the acquired empiric experience is not as much important as the resulting logistic and mainly kinematical aspects. Simulations are now of help at cutting costs already at the prototype production and at commencing batch production. The phenomenon of continuous production miniaturisation results also from turbulent technical and technological developments, and the trend

seems to be “forever” continued in further and further miniaturisations. Complete and detailed modelling of the process and subsequent strict adherence to it requires utmost tuning in into the even most elemental chained procedures, which necessitates using software means with maximum precision. Miniaturisation of machines and devices is illustrated in Figure 1.

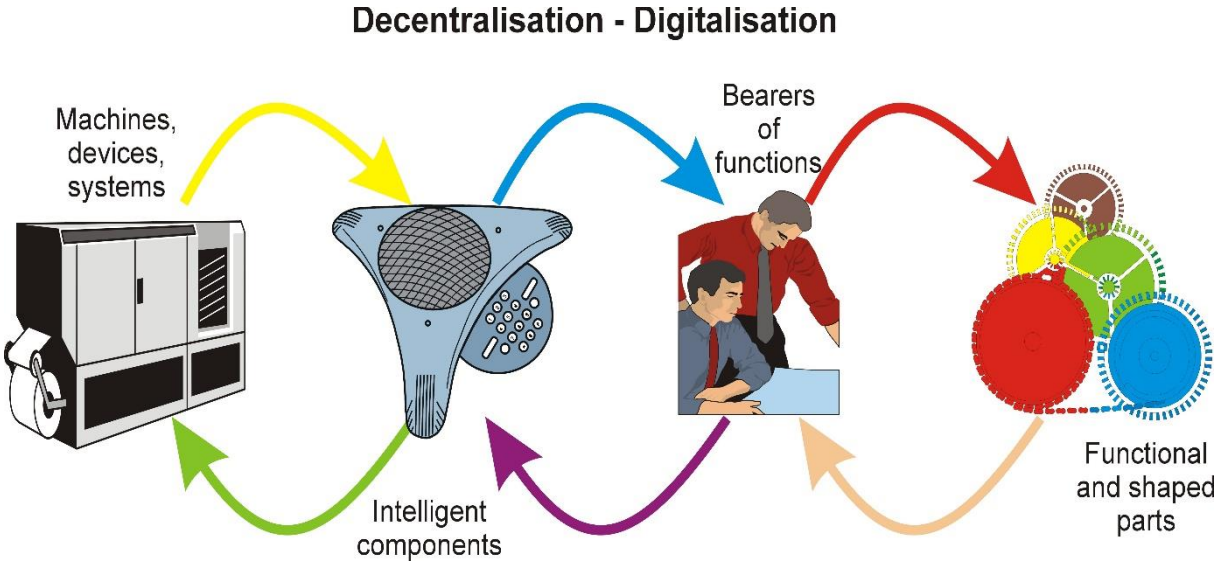

Figure 1 Miniaturisation of Decentralisation – Digitalisation technical elements

Source: Original design

2 Technological preparation of manufacture

Technological preparation of production may be characterised as a set of all technological–organisational activities and work supports targeted at processing the production documentation and supporting documents covering material provisions of the manufacturing process with necessary tools, fixtures, sets of binding technical, organisational and economy related information that secure rational production from the point of suggested procedures, especially then the manufacturing technology, subsequent control organisation, and summary economy.

In technological preparation of production, utilisation of software tools predominantly focuses on:

- Processing of optimisation tasks of technological nature;
- Processing of technical and economical data;
- Proposing of fair shearing plans, cutting conditions, sequence of operational sections, calculations of interoperation additions, etc.;
- Processing of manufacturing and assembling procedures, of the operational technology or control programs for NC and CNC manufacturing machines;

- Processing of data about the owned pool of parts;
- Processing of requirements on special-purpose tools;
- Processing and archiving of the documentation, etc.

CAx systems

The entire life cycle of a product is these days supported by software tools and IC technologies. The set of such technologies and tools includes all the activities, such as design and construction, planning, control, manufacture and post-production… with utilisation of continuously upgraded specialised computer systems hooked on quality and powerful networked computers. New software technologies are most frequently implemented in the engineering industry, and primarily introduced are CAx systems. Even though the systems can significantly increase competitiveness of a business prior to their introducing it is necessary to perform a series of analyses, and only then to decide on the system that is tailored to suit conditions prevailing in the specific company. Properly implemented CAx system must be compatible with all in-company already existing systems. Thus, it is quite impossible to positively answer the question: **"What type of CAx system suits specific company manufacturing conditions?"** CAx systems are computer systems designed to support activities at all stages of production: from developing and proposing a part through manufacture planning and through realization of production up to warehousing and dispatching; at a time, they are utilised in various branches of industry on varying stages of managing, and they speed up and simplify especially engineering activities such as graphical design a modelling, dimensioning, performing various analyses, projecting but also other business administrative activities as management of documents, archiving, data mining, distributions, etc.

The most chronically known and used computerised systems are CAD and CAD/CAM systems. Besides, existent is a series of CAx systems that present an important tool for increasing productivity, effectiveness and rationalisation of work, reliability, precision of parts and decreasing their production costs.

Basic division of CAx systems is illustrated in Figure 2.

Thus, the CAD/CAM (Computer Aided Design / Computer Aided Manufacturing) is by computer assisted system with integrated product both design and production support. Used rarely is also CADM contraction (Computer Aided Design and Manufacturing).

Gradually, developed along with CAx systems were systems that integrated chains of activities: *part design + proposed technology + manufacture* into a single complex system. On the fully automated principle based systems present a new form of technological preparation of production. Based on the production constructional preparation results processed are information necessary for planning and controlling the technological process inclusive of auxiliary, manipulation and control activities.

The object of CAPP (presently, CAPP systems are software products that complexly resolve the technological documentation designing area, and are often integrated with CAD, CAM, CAQ and PPS systems) is to device manufacturing base – e.g. technological procedure, rules of operating, etc. – for the subsequent CAM system, when to utilise that it is necessary to posses the information on how would be the part produced, how intricate NC machine will be producing it and under what conditions. The basis of devising technological documentation is agreeing on technological procedures. Technological procedures define complex manufacture of parts and also assembling and disassembling of final parts. Further, a technological procedure determines necessary manufacturing devices, tools, measuring instruments and technological conditions, and also fixtures so that the part could be manufactured at all, and the would-be system could be assembled and also disassembled. The ultimate result of the work of applied scientist is a technological procedure fitting within complex technological production preparation. Utilisation of CAPP systems can be effective only if these systems will be integrated into the company complex information systems. Possible interconnection of the CAPP system with other systems of a manufacturing company is illustrated in Figure 3.

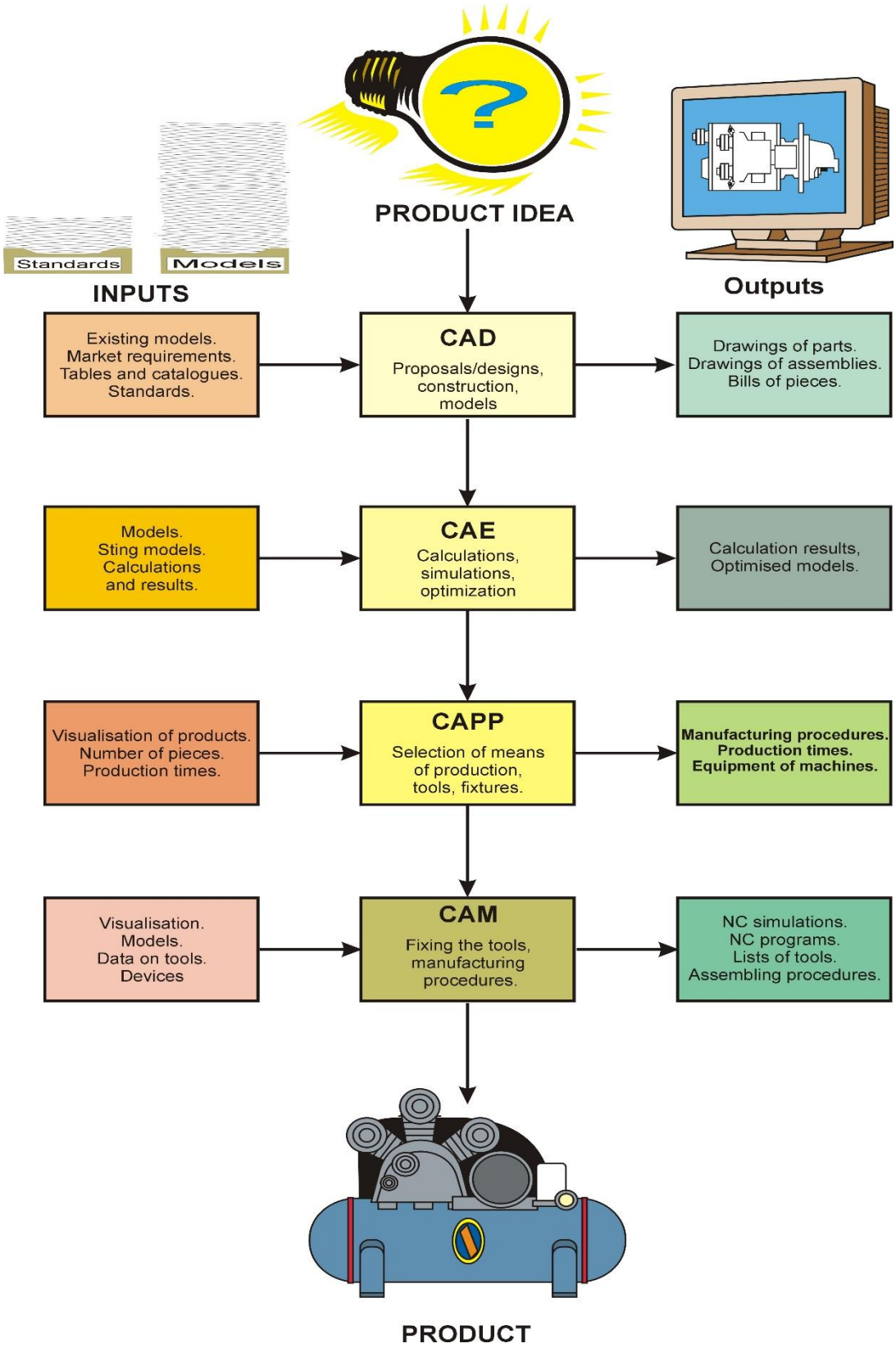

Figure 2 Basic division of CAx systems

Source: Original design

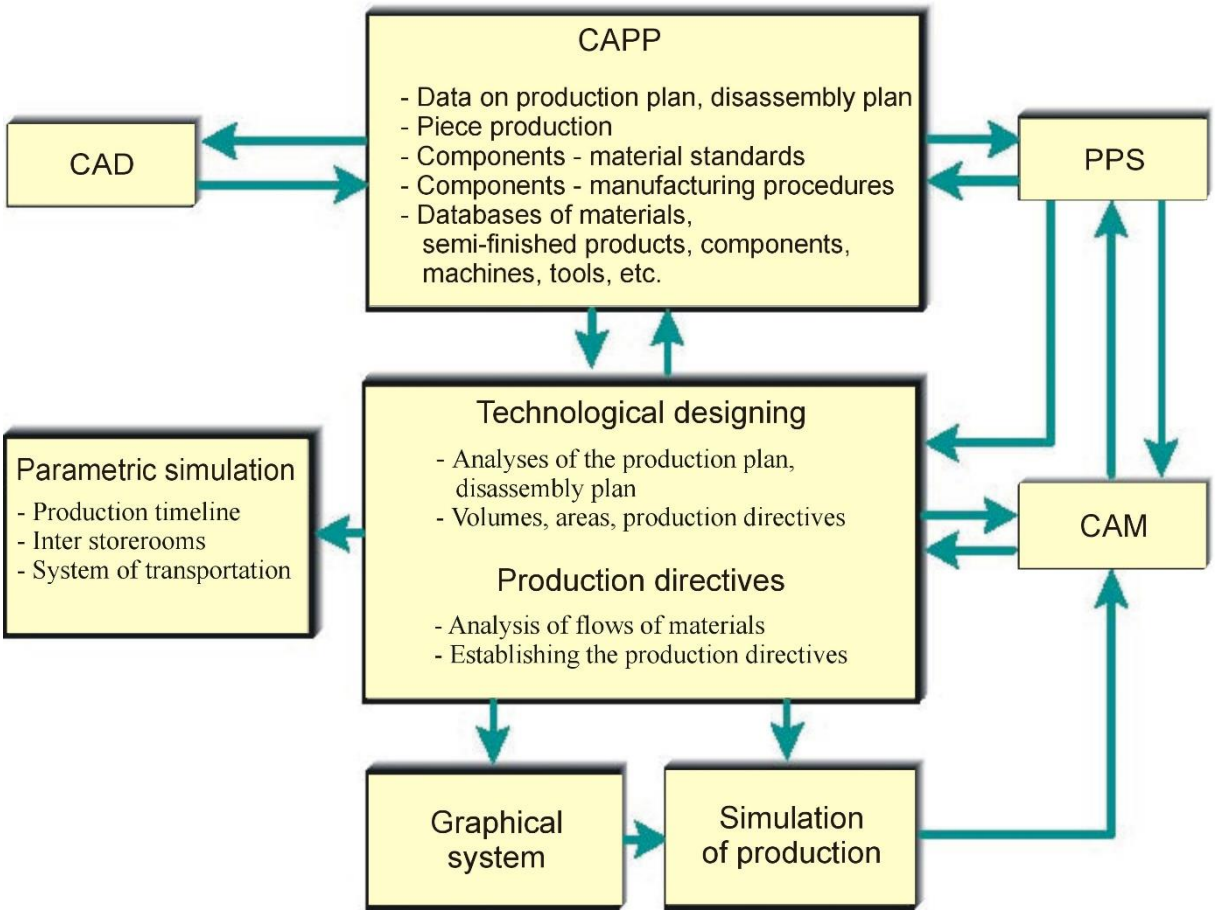

Figure 3 Interconnection of the CAPP system with other systems of a manufacturing company

Source: Original design

Supported by variant CAPP systems are the below activities:

- Classification of parts;
- Coding of parts;
- Technologic procedure editing;
- Allotment of material standards;
- Calculation of work performance standards;
- Visualisation of technologic operations and procedures;
- Generation of operational "G" codes for NC and CNC machines;
- Categorisation and archiving of technological documentation.

In general, the technologist processes the below kinds of information:

- Information on the part;
- Information on the machinery;
- Information on auxiliary equipment;
- Information on manufacturing possibilities.

If expected is applying computer support of technological procedure, the input information have to be in electronic form so that they could be subsequently computer-processed. Same as with constructional preparation, also at technological production preparation may consistent applying of ICT means result in qualitative turn that dwells in supporting the engineering-technical activities and in elimination of routine, monotonous a psychically exhausting activities.

3 Basic methods of developing NC programs

History of computer support of the manufacturing process dates back to 50s of the past century when proposed was the concept of numerically controlled machines. This was the first stimulus for the onset of electronisation and later on computerisation of production. However, only the concept of digitally controlled manufacturing machines (CNC – Computer Numerical Control), which started in 1970, allowed to significantly expand production supporting computer systems. In general, the NC program can be compiled in following manners: by direct entering of the NC-code, by use of geometric programming languages or by use of CAM software:

a) Direct entering of the NC-code

Involved in this case is manual processing of the NC program. Basically, it requires that one be familiar with the NC program-entering format, i.e. structure and syntax of a specific control system, meaning of instructions and functions, and the ability to calculate coordinates of each significant point of the tool travel. Included in principal information necessary for developing an NC program are: type of the NC machine used (incl. the control system type), kind, shape and dimensions of the semi-finished product or machined part, required shape, dimensions and coarseness of the part surfaces, tooling (numbers and types of tools to be used), technological conditions (travel of machine, cutting or drilling speeds).

b) Use of geometric programming languages

Geometric programming languages are intended for automating programming of the NC production devices. Entered to a computer, by use of languages, are assignments in symbolic form. Quite outstanding in the range of languages is the ATP (Au¬tomatically Programmed Tool), which ranks highest and that was the model for other ones, such as ADAPT, MINIAPT, EXAPT, AUTOPROG and others. It was based on languages as FOR¬TRAN, ALGOL and more. The computer software performs calculation necessary for generating coordinates of positions of the vary tool, whilst calculations are triggered by commands. By use of commands compiled is the description of shape and dimensions of the tool, defined are trajectories of the cutting tool, set are cutting and travelling speeds of the tool and other necessary machine functions.

c) Use of CAM software

Presently, the techniques of NC programming of the machine culminate in large CAM and CAD/CAM software. Typical for the large CAM software is that used for generating the NC program is an externally processed computer model of a part (developed, quite naturally, by an appropriate CAD system).

The very NC program developing proceeds generally in the below outlined manner with all CAM software:

- Upload of the part model using an appropriate format,
- Orienting of the part model to a desired position that reflects approach of the tool,
- Setting of technological parameters such as depth of cut, RPMS, travel speeds,
- Entering the tool data, i.e. type of the tool, dimensions (e.g. diameter and length of the milling cutter),
- Entering of the PC data: tolerances (deviations) of shape and dimensions of the processed plane and modelled plane, respectively; tolerances for achieving surface coarseness,
- Entering data on tool movements when engaged and disengaged, i.e. machining strategies,
- Launching of processing – started is processing the result of which is in each CAM system for processing a file called CLDATA – Cutting Location Data. CLDATA is a file containing coordinates of points (X, Y, Z), i.e. of position of the tool, as well of the manner of moving from point to point (feed, fast feed). The file is universal, general, and though not legible with each machining device control systems. It is deemed to be an inter-element at developing the NC program, and is the input file for programs that translate this file into "intelligible language" of the machining device control system. These programs are called Postprocessors.

d) Use of CAD/CAM systems

Holding here are analogies with the preceding case with the exception that CAD/CAM systems have CAD-tools for developing the part model, and out of the model is by CAM-tools for generating the NC program developed the program directly from the environment of a single computer. These CAD/CAM systems can be excellently utilised in the field of producing 3D parts with complicated and intricate shapes.

4 Innovations supporting information systems

As with any other fields, developed and installed have been software tools also in support of innovations. These rapidly advancing tools are slowly phasing out the human being from managing thoughts and from resolving the problems where precision approach to pertinent technical knowledge proves to be a must.

Nowadays, the computer is helping engineers to come forward with impressive, revolutionary ideas in time shorter that e.g. needed for the traditional brainstorming.

This grants them the opportunity to better:

- Process new generations of products and technologies;
- Renovate and prolong service lives of already existing products portfolios through cutting down costs and enhancing functionality or quality;
- "Rehabilitate" product defects, which translates to minimization of risks;
- Secure maximum profitability;
- Satisfy the customer and secure their loyalty;
- Locate new markets;
- Find new applications for already existing technologies;
- Foresee the development of a product or a function of it;
- Creatively predict and eliminate latent ways of the product failing already during its developing, manufacture or use.

A top-ranking software product for innovating has been devised by Invention Machine Corporation and is trade-named "GoldFire Innovator"; it is intended for complex and systematic knowledge sharing solutions at resolving technical and technological issues, and also for diminishing the time necessary for introducing an innovation to the market and for maximisation of return of invested development costs. Goldfire Innovator provides companies the opportunity to step up innovation activities in the below run down fields:

- Support of the in-company implemented innovation process through introducing verified methodologies for fine-tuning of constructions and processes.
- Approach of the solver to interdisciplinary scientific-technical knowledge present in electronically available documents on the Internet.
- Prompting solvers to arrive to innovative solutions through precision investigating, capturing and sharing information and knowledge.
- Shortening of the introducing innovation to the market period due to systematic proposing of solution variants already on the conceptual stage.
- Optimisation of the necessary knowledge searching process.

The Goldfire Innovator program includes self-contained modules "TechOptimizer" and "Knowledgist" that are interconnected tools for sophisticated enhancing of functionality of constructions and processes (TO) and a precision locator (KN) of scientific and technical global information contained in electronically available Interned documents. Researchers and engineers use TechOptimizer first, to perform detailed value, i.e. functional costs analysis of

their product or process. Formed is a list of technical issues, innovation assignments that have to be sorted out so that the postulated innovation objectives could be arrived at. Subsequently, the innovation tasks are confronted with recommended solving heuristics, separations and developmental technical trends. Once the innovation task assignment is by TechOptimizer defined and chronologically arranged, used is the Goldfire Intelligence – to look up relevant specific ways of resolving in the form of answers or pieces of knowledge that can afterwards resolve the given problem. In the process, the system allows to comb through thousands of scientific-technical aspects in all scientific disciplines and the global database of documents (various WEB portals); within its own database it has stored over 15 million processed patents that may contain information or the knowledge usable at resolving the issue. Quite a number of technical solutions has been documented, and are stored someplace – be it in the PC of an individual, employee of a specific company, in an enterprise database, in the database of world patents, etc. Using the Goldfire Intelligence, these sources of documents can be as-if "read" and "scanned" for obtaining answer to the entered question. The output non-structured electronic document is first disassembled to individual semantic items: sentences, word classes, phrases, and tags that present the core developed in the body text. The items are next compared to the items appearing in the request. After evaluation, the solver obtains answers in the form of documents items of which precisely answer his or her request.

Now, Goldfire Intelligence provides not only database of information but also of knowledge derived from patent files and other documents. Thus, the user may obtain detailed information on:

- Trends in technologies;
- Innovation activities of competitors;
- Activities of individual researchers;
- Contents of patents or on basically other theoretical and technical features of the problem being investigates.

Conclusion

When proposing technological manufacturing procedures one works with a high number of information, with various material code lists and catalogues. Elaborated is technological documentation that is archived, and oftentimes the archived documentation is subsequently further modified. The job involves numerous activities as searching for data in catalogues or in archives of documentations, and the activities are routine and often boring or stereotypical. Whereas proposing of the very manner of production typically presents a planning activity arrived are to be at a host of decisions. The technological procedure developer often works with incomplete information, and hence he or she has to use its "technical intellect" and flexibly adapt himself to varying conditions the reflect the momentary company situation as, for example: unforeseeable breakdown of a production machine; non-delivery of a required material; supplies

of material of improper quality, etc. Then the issue is how to computer support activities that involve knowledge, intuition and heuristics. Usually, traditional programming techniques do not work, and applied have to be methods and programming techniques that are able to, at least partially, replace activities typical for human decision-making. Typical for new technologies is: Short distance between designing and manufacturing the product (rapid prototyping); Preventive optimization of the product and of the manufacturing process (virtual engineering) and Controlling means of production through usage of technical intelligence.

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COMMUNICATION OF CORPORATE SOCIAL RESPONSIBILITY IN SMALL AND MEDIUM-SIZED ENTERPRISES

Milan DŽUPINA – Andrea BLAŽEKOVÁ

Abstract
In the article, we analyze the communication of corporate social responsibility in small and medium-sized enterprises and deal with the issue of defining peculiarities of such a communication. The sample consists of 45 small and medium-sized enterprises that have been nominated or awarded in the Via Bona Slovakia competition in their presentation on the website. The main subjects of the research are communication messages dealing with corporate social responsibility, which SMEs address to individual stakeholder groups. Finally, we will formulate practical recommendations for managing CSR communication in small and medium-sized enterprises.

Keywords:
Marketing communication, small and medium-sized enterprises (SMEs), corporate social responsibility, stakeholders

Introduction

In the current socio-economic environment, there are a growing number of companies that accept the argument that an enterprise, in addition to its original responsibilities and business objectives, must also accept its corporate responsibility (Morsing, Perrini, 2009). Enterprises, among other activities, are starting to support education and overall engagement in managing local communities (Curran et al., 2000). Reasons for engagement in CSR vary depending on size, and the associated business reach. In the case of small and medium-sized enterprises, there are different ways of management depending on the differences in existing organizational structures (Jenkins, 2009; Perez-Sanchez et al., 2003, Tilley 2000), which subsequently affects the content, nature and extent of their socially responsible business. The scope of both theoretical and empirical research dealing with the implementation of CSR in SMEs is currently limited. There is a growing interest in this area, as the importance of the SME sector and its social, environmental impacts, supported in particular by European Union initiatives (Jenkins, 2006, Carroll, Shabana, 2010), is growing.

Definition of CSR

The definition of CSR has been given sufficient attention in the literature. Still, there is still no general consensus on what can be clearly seen as a CSR. Differences arise from different views, the historical context of their origin, but also from the territorial definition of the definition (Jupine, 2013). CSR covers several sub-concepts that focus on a certain area of social responsibility (Kašparová, Kunz, 2013). In other words, the CSR is characterized by an interdisciplinary character. Lockett et al. (2006, p. 116) refer to CSR more than

"the research area" than as an independent discipline. Definitions of CSR are most often addressed by these four areas, namely economic and social, voluntary, and stakeholders. More than 80% of the definitions are addressed, except for the environmental domain (59%) (Dahlsruda, 2008). More than the definition itself, it is important for the practical application of CSR to understand the basic CSR dimensions that we can include (vol. Jupiter, 2014), the company's commitment (debt), interest groups and three pillars of sustainability.

The importance of interest groups in managing companies

From the point of view of the development of theory and practice of CSR, the development of the theory of interest groups has been of great benefit. It is only very difficult to assume that any firm can be responsible in its entirety (Jupiter, 2014), all the more so for a small or medium-sized enterprise. Responsibility should be based in particular on its focus and the tribal activities it carries out. It is precisely the theory of interest groups that narrows the broad concept of society to groups or individuals that have an impact on the activity of an enterprise or which it affects its activities. The stakeholder approach to CSR allows identifying the most important groups or members of the company to which the company should be held responsible (Carroll, 1999; Doležalová, 2005, In: Kolektiv autorov, 2005). Effective stakeholder management is referred to as "stakeholder management", while simultaneously paying attention to the legitimate interests of all relevant stakeholders (Donalds, Preston, 1995, p.67). Interest groups are "individuals or groups who have or claim ownership rights or share in corporations and its past, present or future activities." (Clarkson, 1995, p. 106). Most often, we can meet the following interest groups and their expectations with CSR and the way companies try to implement their CSR activity and the content of the communications messages themselves.

Table 1. Requirements of individual interest groups

Interest groups	Expectations from the business
Owners and investors	Gain Growth of business value Transparency
Customers	Quality products and services A reasonable price for the product After-sales service
Business partners	Quality of contracts and negotiation timely fulfillment of commitments
Employees	Adequate wages and non-financial benefits for paid work Good working conditions Professional growth and the possibility of learning Reconciliation of personal and professional life
Local community	Financial or material support Acquiring know-how from corporate volunteers
Environmental non-profit organizations	Organic production Products and services Minimal environmental burden

Source: BATEMAN, 2003, In: STEINEROVÁ, M., VÁCLAVÍKOVÁ, A., MERVART, R. 2008a. Corporate Social Responsibility. Guide not only for SMEs [online]. Prague: TOP Partners, s.r.o., 2008, p. 16. Available at: http://www.csronline.cz/wp-content/uploads/2012/11/BLF_Pruvodce_CSR.pdf.

CSR communication

In practice, there are several tools that serve to communicate corporate CSR core messages. Most often, CSR reporting is a "process of communicating social and environmental impacts of an organization's economic activity to defined stakeholder groups within the company and society as a whole" (Gray et al., 1996, Snider et al., 2003). The process of compiling CSRs puts high demands on companies, and for this reason, the ability of companies to build quality CSR management is a guarantee of corporate stability and high quality management. A recognized international standard for reporting corporate social responsibility is the set of directives of the Global Reporting Initiative (GRI). Sustainability reporting, at the initiative of the GRI, identifies "the way measurement, disclosure and responsibility for organizational reporting on internal and external stakeholders towards achieving the goal of sustainable development (...). The Sustainable Development Report should provide a balanced and adequate picture of Sustainable Development's performance - including positive and negative impacts - (GRI, 2017).

Together with the growing reach of the Internet as a communication medium, the number of companies using the Web site is growing as a means of spreading information about their socially responsible business. The disclosure of CSR on the Internet has become an essential part of CSR reporting, especially for large companies that are continually pressurized by shareholders and under media supervision (Fassin, 2008; Snider et al., 2003). Websites that incorporate CSR messages into their content are characterized by a higher degree of

interconnection between companies and their stakeholders, as they can spread more information than traditional media (Marken, 1998). CSR messages and CSR messages on websites differ in particular in continuity and frequency (Jenkins, 2006). Corporate CSRs are typically published once a year, while CSR messages are communicated on a web site continuously. CSR reports are typically part of corporate websites, within specialized sections created for this purpose. Other CSR communication tools that are external or internal in this case include emails or classical mail, corporate magazines, employee training, company information boards, intranets, and codes of ethics (Steiner, 2008, p. 26).

CSR in small and medium-sized enterprises

Small and medium-sized enterprises are the main source of entrepreneurial opportunities, innovation and employment (EC, 2006). Compared to large companies, they differ in several respects. They have different management modes and types of organizational structure (Jenkins, 2009, Perez-Sanchez et al., 2003, Tilley, 2000), which affects the content, nature and extent of their socially responsible business. In recent years, the number of empirical studies focusing on CSR in SMEs has increased, and the need for further in-depth analyzes and research to address this issue is increasing (Morsing and Perrini, 2009, Murillo, Lozano, 2006, Spence, 1999, Hornsby and Kuratko, 1994, Sweeney, 2007). A deeper understanding of the nature of current CSR activities in SMEs has the potential to stimulate a significant positive impact on the global economy and society as well as on the enterprises themselves (Morsing, Perrini, 2009). The higher rate of implementation in SMEs can really contribute to the further development of CSR, as responsibility is not only a privilege for large enterprises, but a matter for the entire business sector (Kašparová and Kunz, 2013). Several authors look at the implementation of CSR activities in small and medium-sized enterprises through the optics of large companies and claim that the concept of CSR is universal for all enterprises (Spence et al., 2003, Tilley 2000; Wilkinson, 1999). However, academics have come to the conclusion that CSR, as a concept for large businesses, can not simply be "cut out and stuck" into the reality of small and medium-sized enterprises (Jenkins, 2004). The involvement of CSR activities in SMEs is implemented in ways other than large enterprises based on other business models, strategies and tools (Morsing and Perrini, 2009). The key difference is that in small businesses ownership and management are not separated to such an extent as in large corporations. The acceptance of the concept of CSR in SMEs is to a large extent influenced by the character, personal conviction and values of the founders of the enterprise or of the owners / managers (Morsing and Perrini, 2009, Jenkins, 2009, Murillo and Lozano, 2006, Spence, 1999, Fassin, Sanchez et al., 2003). The implementation of social and environmental strategies in SMEs is therefore primarily dependent on the motivation of the owners and managers of their internal values and moral moves. SMEs develop CSR activities naturally as a consequence of the requirements of employees or the surrounding community. However, SMEs rarely refer to them

as CSRs, as they usually apply less formal approaches to CSR or concepts lacking sufficient awareness (Vives, 2006). According to Murillo and Lozano (2006), the driving forces behind CSR development are:

- • the nature / value of the founder,
- • social / economic model manager,
- • competitive impact,
- • the possibility of upgrading,
- • the desire to distinguish,
- • legal regulations,
- • vision / mission anchored in company status.

Thus, pragmatic reasons outweigh the pressure of external stakeholders, particularly customers. The authors highlight the fact that, from the point of view of the companies surveyed, their social activities have unambiguous economic consequences. Similar results were also achieved by Williamson et al. (2006), who to a large extent confirmed that the performance of the enterprise was the main motive for the implementation of CSR activities by SMEs, but a higher degree of engagement was due solely to the regulatory measures adopted. Compared to large enterprises, the principle of volunteering is not very important for SMEs (Graafland, Smid, 2004). SMEs will not and, due to supply chain pressures, can not accept voluntary CSR activities. Therefore, regulation is considered to be a key factor in improving the environmental and social practices of SMEs. Owners and managers in SMEs perceive CSR as an expensive or complementary activity that the market and the competitive environment do not require directly. The main reasons for this are limited resources and the perception of CSR as a tool for corporate image management (Murillo, Lozan (2006)). Small and medium-sized enterprises, considering their involvement in CSR, are concerned about increased financial costs and lack of time (Vives, 2006; Spence et al., 2003), at least in the area of increasing their administrative burden, which may be problematic in their personnel constraints.

Communication of CSR in SMEs

If companies decide to invest time and energy in the implementation of the CSR concept, they need to communicate with them in the appropriate way (Steinerová et al., 2008). A great benefit for SMEs is also the increased interest of the media and the public. Unlike large corporations, there is little knowledge about CSR communication within SMEs, both in theory and practice. In this area, we have identified only a few research (Mulović et al., 2015; Dincer, Dincer, 2010, Nielsen, Thomsen, 2009). It is mainly about determining the motives of CSR adoption in SMEs, with the topic of communication being addressed only marginally (Fassin, 2008; Jamali et al., 2008). In particular, they focused on identifying the individual channels of communication used by SMEs. SMEs, due to limited financial and human resources, do not usually create CSR reports, but this does not mean they behave inappropriately in their business (Fassin, 2008).

SMEs often approach CSR less formally (Nielsen, Thomsen, 2009) External communications channels that can disseminate corporate CSR information include trade unions, corporate foundations, personal contacts (Murillo, Lozano, 2006) and articles in the media, in addition to CSR reports and websites, and internal media CSR communications are, for example, newsletters, corporate magazines, marketing brochures, regular internal corporate meetings, welcome packs for new employees, and technical product documentation, including environmental aspects (Nielsen, Thomsen, 2009) their CSR activities advocates PR agency promotion, others publish awards and standards in their corporate magazines and materials, or on websites (Jenkins, 2006). On the other hand, there were also companies that did not feel comfortable in promoting their CSR. They considered it a big business affair, and it felt like many big companies were committed to CSR just to gain benefits and positive publicity.

Material and Methods

The research set of qualitative research of this thesis is small and medium-sized enterprises, operating in the territory of the Slovak Republic, presenting their activities through websites. When creating a sample, we assumed that a small number of SMEs, compared to large companies, would have corporate websites. At the same time, it could be expected that only a few companies will report on their CSR activities on the Internet. Given the research possibilities, we were looking to find a list of the most economically performing SMEs, where we predicted a higher level of communication positives addressed to individual stakeholders. For research purposes, we were based on award-winning Pontis - Via Bona Foundation. Of the total number of nominated companies, we selected 45 small and medium-sized businesses that have websites. When determining the size of a business, we were based on a classification according to the European Commission (2006) and are therefore enterprises with fewer than 250 employees and with an annual turnover of less than 40 million. Eur.

For research purposes, we were inspired by the qualitative methodological approach implemented in Snider et al. (2003), which we have adapted to our conditions and research objectives. At the first point, we selected 45 companies awarded the Via Bona Award, whose websites are the subject of our research. All web pages have been thoroughly reviewed to identify all CSR statements and target them to thematic categories. Each statement related to CSR, either directly or indirectly, has been entered in the table in the appropriate categories. These were gradually added to the next (Open Encoding Scheme). After reading all the websites we have the final list of categories back confronted with each surveyed company while we verify that they are properly grouped according individual statements, or better characterize the new category. If the content required it, one statement could be assigned to several stakeholder groups or included in several categories within a group. The website we primarily explored the section describing the action, character, or vision and mission of companies, further

sections for current and future employees, the section for journalists and subsequently the rest of the website. Attention was also paid to the study of codes of conduct, codes of conduct or environmental policy declarations, all available statements being recorded. To obtain a report in a large set of content in each of the thematic categories, we have compiled a table of all communication messages. We also mapped the matrix of the total occurrence of identified types of messages within each category. Since this is a qualitative research, the number of these categories serves primarily for basic overview and illustration, and therefore we will not evaluate it statistically. The importance of our research is primarily their thematic extent.

Research results

The main objective of our research was to find out how and to what extent selected SMEs are presenting CSR communication messages on their websites in relation to individual stakeholder groups. In order to put this into a workable form, as a partial goal, we determined what topics (and the range of themes) make up the content of these communication messages addressed to each stakeholder group. To get an overview of our research results, we will show in this chapter a summary of our knowledge across stakeholder groups and determine the limits of our research and recommendations for further research. Firstly, we have defined a group of "general statements" on ethical and social responsibility of businesses. Right from the start, we encountered a major problem, which is one of the key findings of our research. This is the fact that on the websites of the SMEs under examination, in essence, no statements can be found that would demonstrate the general approach or attitude of companies to CSR, or define general objectives at the level of their socially responsible business. By default, however, it is possible to feel an environmental undertone in the statements. Another finding is the fact that the SMEs surveyed do not publish general statements (98% of enterprises) about CSR or its equivalent. Of all the enterprises surveyed, only two realists admit the use of CSR as a means of positively influencing the image of the business, which contrasts with research conducted under English conditions (Jenkins, 2006). Businesses do not have a real need to report on these activities, insufficiently appreciate the significance of such expressions. A number of foreign authors have come to similar outcomes (Jenkins, 2004; Vives, 2006; Fassin, 2008; Murrilo, Lozano, 2006), which may indicate that SMEs apply a less formal approach to CSR than large firms or concepts lacking sufficient awareness . In view of the above findings, we primarily focused on identifying the CSR principles in our research, and the SME messages were also considered in relation to the three pillars of sustainability. The messages that represent this theme include references to companies' efforts to lead an open dialogue with several stakeholder groups in an effort to eliminate the negative impacts of business activity on their stakeholders, and so on. Another principle of CSR, as well as the title of the category of general statements, is transparency. On the theme of transparency as well as compliance with business ethics principles, businesses

most often expressed themselves in the context of formally anchored codes of conduct (Code of Ethics, Code of Business Conduct, or Code of Quality and Environment Policy). In the case of SMEs, the emphasis was on high quality. Although quality statements are related to CSR on a marginal basis, they are a hallmark of SME communication. Up to 36 of the 45 companies surveyed have incorporated general quality service and product statements on their website, which could be seen as an element of the economic pillar of sustainability. The environment has a relatively strong representation in the case of the messages of the SMEs surveyed. A third of companies are presenting themselves as their responsible partner in the environment. A particular form of environmental policy is mainly declared by manufacturing companies and enterprises dealing with the disposal and sorting of waste, either through general formulations or concrete examples of activities. Other tools are implementation of environmental certificates and awards. As part of the messages of the SMEs surveyed, the economic benefits resulting from CSR activities are most often related to the environment, such as the use of environmental technologies or alternative fuels.

Interest groups

We identified two types of messages addressed to customers as the first major stakeholder group on the SME web site. The first type addresses the customer by naming "unique" properties of products and services. The second type declares a certain relationship between the company and its clients. Such messages emphasize the value of products and services that are designed to meet individual customer needs and requirements. They emphasize listening to their customers and building long-term partnerships with them. Such claims are contained either in the general statements of companies or illustrated by a specific description of the steps of the company's cooperation with customers, various guarantees of satisfaction and the like. Messages for both current and potential employees generally represent corporate culture or describe the attitude and relationship of the firm to employees. Several businesses declare that their employees have a major impact on the company's success, and therefore promote their personal and career development and provide them with many benefits. The edge groups of stakeholders are groups of managers, students and graduates. While relationships with managers define businesses that have adopted codes of ethics and business behavior, students and graduates refer only to 7% of businesses, mostly through internships or graduate practices. The last group of stakeholders, to which SMEs are increasingly focusing their attention, is the company. Dominant are messages, centered on national society. The company as a whole represents in this case an "international company" that crosses the state border. This is particularly the case with internationally operating companies operating in a wider international environment. We can also see on the website that companies share their expertise by educating students at secondary and higher education institutions (lectures, workshops, free versions of programs), or publish professional videos, tutorials and advice on their websites, and tips of a popular-educational nature in their

business. They also report on their engagement in charitable activities or say they support various educational projects. Interesting thematic category is the quality of life that includes statements from companies where corporate responsibility is linked to the mission, product or service of the business itself. They should contribute to improving the "quality of life" in society. Other stakeholder groups with a marginal position on SME websites are business partners, competition, government, and public institutions and shareholders. Relationships with these groups are defined by companies with codes of ethical and commercial behavior. A closer analysis of these statements is not necessary.

Conclusion

The research results point to the fact that CSR is the website of SMEs surveyed nearly unknown concept, not literally, though that this is only the companies that were awarded or nominated for its responsible approach to business. The concept of CSR, or its Slovak equivalent, was present on the websites of two SMEs. The other two companies use the modified term "responsible business" or "responsible producer". Some companies mentioned on the website that they received the Via Bona Slovakia award but did not express their own CSR activities. In most cases, there were no statements that would demonstrate the general approach or attitude of companies to CSR. Most often, the concept of CSR in companies has been linked to the area of environmental protection. We can also meet cases where companies combine the concept of compliance with legislation. However, most of the references to CSR on the website were indirect. The most common form of the messages and general statements, in which companies declare their desire to have an open dialogue with a number of stakeholder groups, efforts to eliminate the negative impact of business and reported to the principles of ethical and transparent business. About 30% of businesses present themselves in their messages as their responsible partner for the environment. Within the messages analyzed SMEs are the economic benefits resulting from CSR, most often apply just to the environment, for example by using green technologies and alternative fuels. In relation to customers, we can in particular monitor the emphasis on value-added products and services tailored to the individual needs and requirements of our clients. An important group of stakeholders are employees. Several businesses declare that their employees have a major impact on the success of the company, and therefore promote their personal and career development and provide them with benefits. In the case of a company as a stakeholder group, we identified three subgroups, namely the local community, the national society and society in general. Within the local community, there are references to employing people around the business location and supporting regional producers. In the case of a national society, education is an important topic. The company, in general or international, only contains a few messages about, for example, support for farmers abroad. The last group of stakeholders are business partners (messages on transparency, fair access), competition (correct approach), government and public institutions

(cooperation) and shareholders (transparency). The way in which CSR messages are presented is similar across a number of websites reviewed. The main common feature is the overall inconsistency of the presentation of the information. The results have also been affected by the high transparency of websites. Often, CSR communications are narrowed down to a brief commentary within company news. Based on these findings, it is possible to formulate the following CSR communication recommendations. First of all, it would be appropriate to define the main stakeholder groups that the company wants to focus on in the presentation on the website and at the same time to evaluate its current CSR activities. Then create a list of activities that are key to your business and create a special section dedicated to this topic on your website. Even companies with limited resources would be able to present their social responsibility in such a way.

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CORPORATE GOVERNANCE IN THE SELECTED COMPANY

Miroslava HORVATHOVÁ – Roman LACKO

Abstract

The subject of my Company Case Study is to analyze the Corporate Governance practises performed in the world's largest beverage company: The Coca – Cola Company. The reason why I chose The Coca-Cola Company for my analysis is rooted in my eagerness to reveal what happens 'behind the scenes' regarding the leadership and governance of the company extremely favourite among the consumers all over the world. Firstly, I state basic facts related to the establishment of the company selected and some supporting data for expressing the greatness and importance of the Coca-Cola brand nowadays. Further in this case study, I am describing the Corporate Governance structure in the Coca-Cola Company as well as the characteristics and main reponsibilities of the company authorities who are in charge of implementing the 'governance theory' and rules into practice. Finally, I will conclude the findings and state whether or not there is a good overall governance in the Coca-Cola Company from my point of view.

Keywords:
corporate governance,company, operating segment,shareholder

Introduction

The vision of the Corporate Governance of the Coca-Cola Company is to make a compromise between managers and shareholders when coming to the conflict of their interests and try to find such a way that no party would be ′extremely dissatisfied′. In addition to that, this company is strongly customer oriented and makes a huge effort to present a transparent insight of its governance to the public.

The Corporate Governance principles are ruled by many restrictions and regulations, which need to be followed (The Coca-Cola Company, 2011). The Coca-Cola's approach to the governance principles, regulations and practices is described in the Corporate Governance Guidelines of the Company in detail as well as in the Company's Annual reports and Proxy statements, regarding the following: elections, tasks and main mission of the Board, qualifications needed for performing the position of a Director, the tenure and duties of the Board members, different kinds of the Board committees and their tasks, CEO's and other executives'compensation, etc. (The Coca-Cola Company, 2015).

Board Members and their characteristics

The Board of Directors of the Coca-Cola Company consists of seven Committees which are in charge of performing various tasks, out of which the most important ones stated in the following table (The Coca-Cola Company, 2016, Proxy statement, pp.30-33):

Table 1 Committees of the Board (Coca-Cola)

Committee	Chairman	Other members	Tasks and responsibilities
Committee on Directors and Corporate Governance	Sam Nunn	Botín, Daley, Diller, Lagomasino	- recommendation of director nominees - regular review of the Company's Corporate Governance Guidelines - oversight of the corporate governance affairs of the Board
Executive Committee	Muhtar Kent	H.A.Allen, Diller	-authorized to exercise the power and authority of the Board between meetings, except the powers reserved for the Board or the shareowners
Compensation Committee	Maria Elena Lagomasi	R.W.Allen, Gayle Herman	- evaluation and approval of compensation plans, policies and programs
Audit Committee	Evan G. Greenberg	R.W.Allen, Bolland, Weinberg	- oversight on: integrity of the financial statements and the financial reporting process, the systems of internal accounting and financial controls, the internal audit function and the annual independent audit of the Company's financial
Finance Committee	Barry Diller	H.A.Allen,Greenberg, Kotick, Nunn	- helps the Board fulfill its responsibilities relating to oversight of the Company's financial affairs, including reviewing and recommending to the Board dividend policy, capital expenditures, debt and other financings, major
Management Development Committee	Herbert A. Allen	Diller, Kotick,Lagomasino	- helps the Board fulfill its responsibilities relating to oversight of development for senior positions and succession planning
Public Issues and Diversity	Alexis M. Herman	Buffett, Gayle, Nunn	- helps the Board fulfill its responsibilities relating to diversit corporate social responsibility and public issues

The Committees are established and also can be removed by the Board. Each Committee should consist of at least 3 members. (The Coca-Cola Company, 2016, Compensation Committee Charter). As stated in the table above, there is the Executive Committee consisting of 3 members (2 members + Chairman), 4 other Committees have 4 members and the rest 2 Committees have even 5 members. When talking about the individuals, they are more or less equally distributed among the Committees, unlike B.Diller who is member of even 4 Committees (and Chairman of one of them). As we could see at the table number 2, B.Diller receives third-highest compensation among all the directors (if Chairman Kent not counted). However, the compansation of S.Nunn and M.E.Lagomasino is higher than B.Diller's even though S.Nunn holds 'Director position' of 'just' 3 Committees (Chairman of 1 of them) and M.E.Lagomasino holds the position of Director in 2 Committes (without chair).

The meetings of the Committees can be announced by the Chairman of that specific Committe or by a majority of its members. In 2015, there were 40 meetings of the Committes held altogether (The Coca-Cola Company, 2016, Proxy statement, p.30).

General characteristics

Based on the information provided by the Coca-Cola Company in its Annual Report (p.24-27) for the fiscal year 2015 (issued and published in 2016), I made the following table in order to have a better understanding of the structure of the company's executives and their characteristics.

Table 2 The Executive Officers as of February 25, 2016 (Coca-Cola)

Name	Gender	Age	Nationality	Joined in...	Current position (from-till)*	The length of working for the Coca – Cola Company
Muhtar Kent	M	63	American of Turkish origin	1978	Chairman of the Board (2009 - 2015) and CEO (2008)	31
Irial Finan	M	58	Irish	1981	Executive Vice President (2004)	13
J. Alexander M. Douglas,	M	54	US	1988	President of Coca-Cola North America effective (2014)	26
James Quincey	M	51	UK	1996	President and Chief Operating Officer(2015)	19
Kathy N.	F	57	US	1987	Executive Vice President (2014)	27
Alexander B. Cummings, Jr.	M	59	US	1997	Executive Vice President and Chief Administrative Officer (2008-	11
Marcos de Quinto	M	57	Spanish	1982	Executive Vice President (2015) Left:1988: rejoined: 1990	31
Ceree Eberly	F	53	US	1990	Senior Vice President (2010)	20
Bernhard Goepelt	M	53	German	1992	Senior Vice President, General Counsel and Chief Legal Counsel	19
Julie M. Hamilton	F	50	Genoa/Italy/Seattle, St.Louis	1996	Senior Vice President (2016)	20
Brent Hastie	M	42		2006	Senior Vice President (2016) Left: 2012 Returned: 2013	9
Ed Hays, PhD	M	57		1985	Senior Vice President (2015)	30
Nathan Kalumbu	M	51	Zimbabwe	1990	President of the Eurasia and Africa Group (2013)	23
Atul Singh	M	56	Indian	1998	President of the Asia Pacific Group	16
Brian Smith	M	60		1997	President of the Latin America Group	16
Ed Steinike	M	58	(died:	2002	Senior Vice President (2013)	11
Clyde C.	M	53		1989	Senior Vice President (2008)	19

**Note: in case of having more positions in the company at the same time, I mentioned the most significant one linked to executive position*

17 Executive Officers of the Coca-Cola Company as of February 2016, can be analyzed from many different perspectives. Firstly, I am analyzing the Coca-Cola's executives based on general characteristics like gender and age. Secondly, I am analysing the diversity of nationalities among the Executives. Thirdly, I am trying to look at the 'relationship' between the current position of the executives and the length of the period they have been working in the Coca-Cola Company

before achieving the current position. Finally, I am discussing the compensation paid to the executives supported by datas in the table number 5.

a) gender

Based on a gender, the group of executives mentioned above consists of 3 females and 14 males.

b) age

The age of the youngest executive is 42 years and the oldest executive is 63 years old. We can see, that the oldest executive (M.Kent) actually holds the position of the Chairman of the Board of Directors as well as the position of CEO (′CEO duality′). We can assume, that the ′oldest one′ should have a lot of experience, so from this point of view, his position as a Company's Chairman is relevant. The average age of the executives is 54,82 years, so the Chairman is about 8 years older than the average is.

c) nationality

Based on the facts published by the Coca-Cola Company (2016) regarding the nationality of the Company's Executives, there a quite high diversity can be seen. Except for Americans, the are Executives with diverse origin, e.g.: Turkish, Irish, Spanish, UK, German, Zimbabwe, Indian etc.

d) the length of working experience

As supposed, the Chairman, joining the Coca-Cola Company in 1978, is the longest-employed person in this company among all the executives. M.Kent achieved the position of the Chairman in 2009 (after 31-years working experience in Coca-Cola). On the opposite, B.Hastie, joined the Company as the latest one (when compared to other executives), in 2006, so in 2015 he had 9-year experience. It is not useful to find out the average of these datas since there are different kinds of executive positions.

However, I find it quite interesting to have a look at these two groups: Executive vice presidents and Senior Vice Presidents. While A.B. Cummings and I.Finan became Executive Vice Presidents after 11 and 13 years of experience in the company respectively, K.N.Waller was not promoted to that position until she had 27 years of experience in Coca-Cola. When looking at the career history of those 3 executives, we can assume, that former Cumming's positions (President of the North West Africa Division and President of the Africa Group afterwards) were ′good enough′ for him to get an experience for performing his executive function 11 years after joing the Coca-Cola Company. However, from March 2016 he has been retired, but Coca-Cola announced that it would not rehire to his position, but that the responsibilities would be divided among existing executives (The Coca-Cola Com American City Business Journals, 2016).

When comparing the experience of I. Finan (current position after 13 years of experience) and K.N.Waller (current position after 27 years of experience), we can see, that both of them held similar positions in

accounting in the past. Their age is almost same as well. Only gender differs so here comes the question whether or not it was a reason for the company to wait so long before getting K.N.Waller her current position. Finally, when we have a look at M. de Quinto, who has become Executive Vice President in 2015 (after 31 years of experience, so even 'later' than K.N.Waller), we can come to conclusion that were maybe other factors than gender which made the Company decide as it did.

When analyzing the second group, we can see that there are two women getting promoted to the Senior Vice President position after 20 years of experience. Among the men, the bigger diversity can be seen. B. Hastie got that position after 9 years but E. Hays after 30 years of experience in Coca-Cola, which is quite interesting regarding the fact, that B.Hastie even left the company in April 2012, but got back in July 2013.

Executive Compensation

As published in the '2016 Proxy statement' of the Coca-Cola Company, created following the Annual Meeting of Shareowners in April 2016, the executive compensation can be divided into: base salary, stocks, options, non-equity incentives and the others forms of compensation, adding the changes in pension value, which have to be taken into consideration as well.

Based on the Proxy statement 2015 (The Coca-Cola Company, 2016, p.63), the compensation packages of five most-paid executives (among the group of all the executives in Coca-Cola mentioned above) in 2015 consisted of items stated in the following table:

Table 3 Compensation of 5 most-paid executives in 2015 (Coca-Cola)

Name	Base salary ($)	Stock awards ($)	Option awards ($)	Non-equity incentives ($)	Change in pension value ($)	Others ($)	Total ($)
M. Kent	1,600,000	4,904,848	2,830,597	4,600,00	0	655,126	**14,590,571**
I. Finan	884,844	2,229,487	1,286,634	1,611,94	1,639,329	1,542,46	**9,194,704**
J. A.M.	698,091	4,377,783	1,019,016	1,237,93	73,198	63,682	**7,469,704**
J.Quincey	700,972	3,727,920	636,243	1,523,03	59,071	199,713	**6,846,951**
K.N.Waller	728,406	1,897,287	1,094,927	1,200,08	751,588	59,755	**5,732,046**

It is not a surprise, that the biggest compensation package was 'delivered' to the Chairman/CEO M.Kent. Even though the level of the compensation of M.Kent for the fiscal year 2015 seems to be enormously high, it needs to be pointed out, that in 2015, his total compensation was cut almost to half (more precisely by 42%) when compared to the year before. However, the base salary stayed unchanged, just the amount of stock and option awards was decreased (Kell, 2016).

This measure was implemented in order to 'calm down' investors, as stated further by Bloomberg (Melin and Kaplan, 2016). Basically, this gesture is in accordance with the official proclamations of Coca-Cola (also published in Proxy statement), where stated, generally speaking, that they are willing to find compromises when the conflict of interest between shareholders (investors) and the CEO (executives) arises. That measure could quite satisfy the shareholders due to the overall growth of shareholder return happened later in 2015 (The Coca-Cola Company, 2016, Proxy statement, p.49).

Further according to the Proxy statement (The Coca-Cola Company, 2016, p.63), the compensation amount paid to J.A.M.Douglas in 2015 was lower than in 2014. However, the compensation fee paid to I.Finan and K.N.Waller increased. But taken into account that their compensation amount is much smaller than the amount of M.Kent, the raise of their compensation in 2015 is not so significant for the company. The amount paid to J.Quincey in 2014 cannot be discussed since he did not hold the position of CEO until 2015.

Moreover, when looking at the compensation package structure of all of that 5 executives mentioned above, it can be seen that the biggest item in a compensation package is formed by stock awards, followed by non-equity awards and the rest is formed by option awards and base salary. It can be supposed that the company prefers the usage of long-term incentives over the short-term incentives, with the emphasis on performance-based compensation in order for executives to stay motivated.

Conclusion

Even though, the Coca-Cola Company's operations take place in different segments worldwide, while each segment has its own operating officers and staff, it can be assumed that there is a good leadership and governance of the Coca-Cola Company in general. The effective cooperation of all of the authorities included, i.e. Board of Directors, Executives, CEO, Managers as well as Operating officers responsible for managing each respective segment (with the chief James Quincey on top) is necessary, mainly in multinational corporations, like the Coca-Cola Company is. The rules and regulations published in Company's internal documents and other annual reports required by law and Securities and Exchange Commission unify the Corporate Governance practises in each operating segment of the Coca-Cola Company in the corporate world.

In my opinion, the structure of the Corporate Governance of the Coca-Cola Company is sufficiently balanced. The Board of Directors as well as Executives of the Company consist of individuals, men and women, with diverse age, various cultural background and professional experience with different approach to problem solving and accepting challenges and risk.

To conclude, from my point of view, the application of corporate philosophy focusing on diversity has significantly strengthened the position of the Coca-Cola Company in the global

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DIGITAL DIVIDE IN SLOVAKIA

Matej HUDÁK

Abstract
Development of information and communication technologies in latest years have been revealed as key potential factors for economic growth and social development in countries. However, they can also create inequalities in access and use of them. These inequalities are referred as the digital divide. In this article we focus on the analysis of status of Slovakia within indicators directly related to the digital divide.

Keywords:
digital divide, indicators, Slovakia

Introduction

In recent years, we have seen the rapid development of information and communication technologies (ICT). ICTs have been revealed as key potential factors for economic growth and social development. However, they can also create inequalities. „The diffusion of ICTs drives access to information and knowledge; the uneven distribution of ICTs within or between societies may result in very uneven impact on their economic development and wealth. " (Brixiova et al., 2009)

These inequalities are referred as the digital divide. According to Campbell (2001), the digital divide represents unequal access to information and communication technologies, not only in terms of inputs but also in terms of outputs. Given that investing in human capital is becoming an increasingly important source of wealth, more important than land or investment in physical capital, increasing digital divide may lead to an increase in the economic gap between developed and emerging countries.

Digital Divide

We can generalise the term digital divide as gap between those, who have access to ICT and are able to use them and those who do not. In literature, we can see several diverse definition, from simple ones to complex ones; from those who stress technological aspect to ones that stress social aspect or information aspect.

For example, (Campbell, 2001) states that "the term digital divide is used to describe situations in which there is a marked gap in access to or use of ICT devices." According to Roberts (1998) "the idea of the digital divide refers to the growing gap between the underprivileged members of society, especially the poor, rural, elderly, and handicapped portion of the population who do not have access to computers or the internet; and the wealthy, middle-class, and young Americans living in urban and suburban areas who have access." Miniwatts Marketing Group (2017) defines digital divide as "a social issue referring to the

differing amount of information between those who have access to the Internet (especially broadband access) and those who do not have access."

More complex definition or description is provided by Eurostat (2016; 1): "Digital divide refers to the distinction between those who have internet access and are able to make use of new services offered on the World Wide Web, and those who are excluded from these services. At a basic level, the participation of citizens and enterprises in the information society depends on access to ICT, i.e. the presence of electronic devices, such as computers, and internet connections. The term explicitly includes access to ICTs, as well as the related skills that are needed to take part in the information society." Another complex description of digital divide trough skills and usage of ICT is provided by Van Dijk and Hacker (2003).

Knowledge Divide

In past years, ICTs have become more and more affordable even for disadvantaged groups of users, there is noticeable shift from inequalities caused by uneven access to ICTs to inequalities caused by their usage. "Since gender, age, racial, income, and educational gaps in the digital divide have lessened compared to past levels, some researchers prognosticate that the digital divide is shifting from a gap in access and connectivity to ICTs to a knowledge divide." (Graham, 2011). "It is not just the cost of computers that results in the digital divide, but also the presence of widespread illiteracy among overlooked populations." (Roberts, 1998)

This is also underlined by concepts closely related to the digital divide:

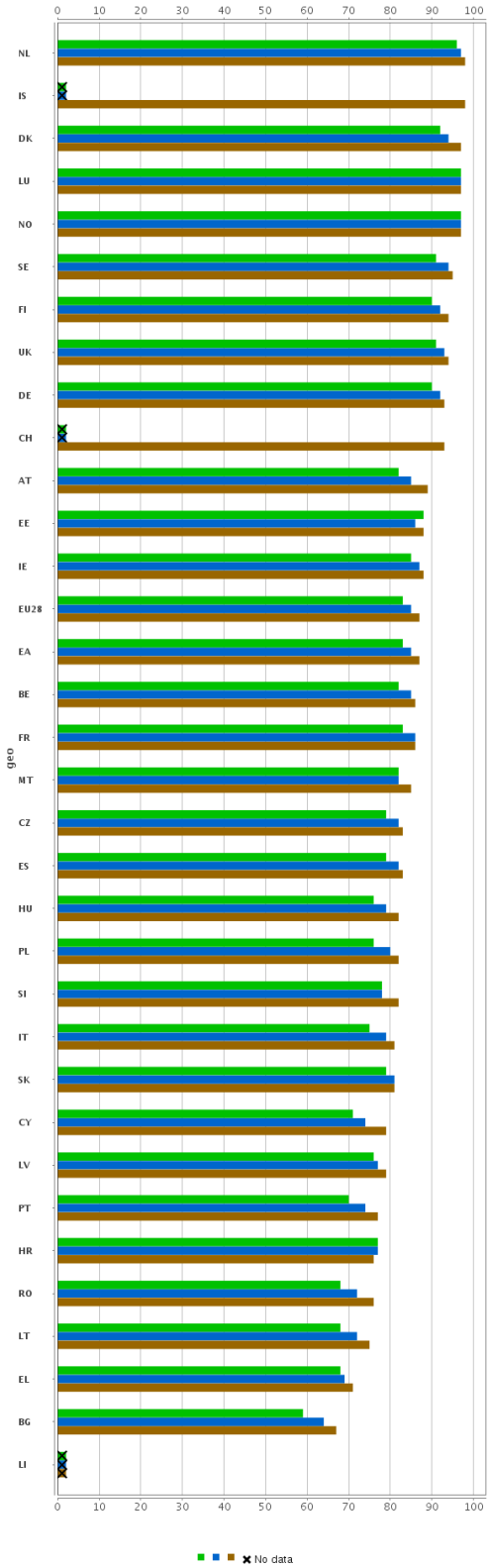
- "Digital literacy refers to the skills required to achieve digital competence, the confident and critical use of information and communication technology for work, leisure, learning and communication.
- E-inclusion refers to the situation where everyone in society can participate in the information society. This requires affordable access to technologies, the accessibility and usability of ICT tools and services, and the ability and skills of all individuals to use these tools.
- E-skills or electronic skills include those needed to make use of ICT as well as those required to apply and develop them." (Eurostat, 2016; 1, 2, 3 and 4)

According to Roberts (1998) these factors are attributing to the digital divide:

- access to ICT,
- level of education,
- household income.

Digital Divide in Slovakia

Next, we will focus on digital divide in Slovakia, specifically on statistical indicators related to the concept of digital divide.



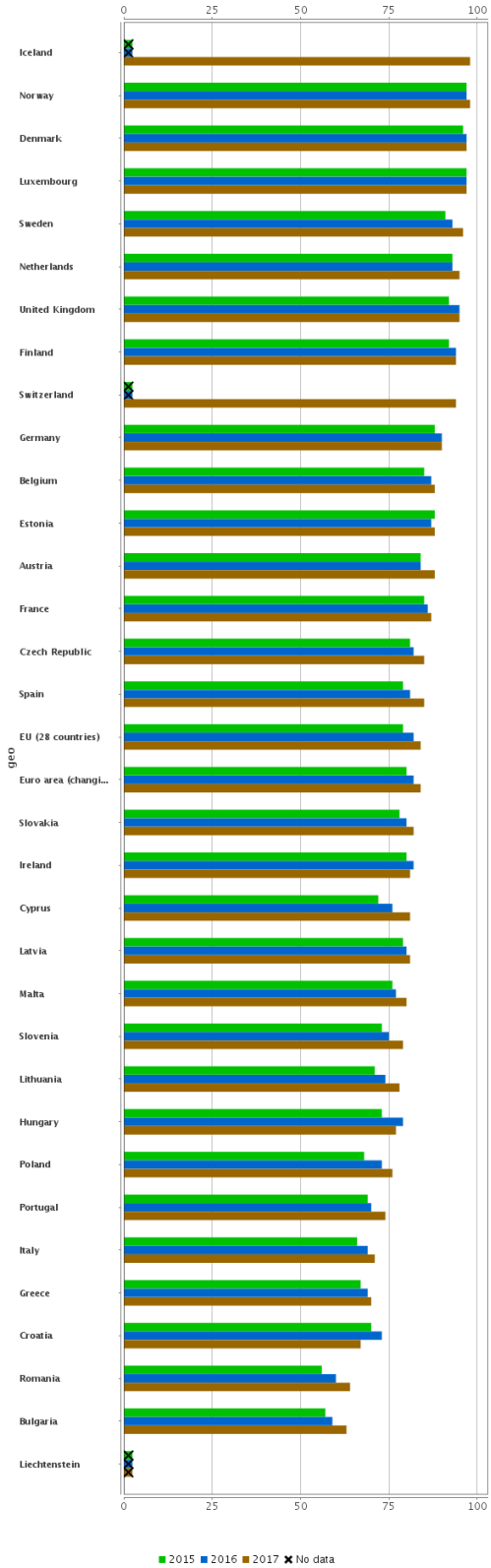


Figure 1 Level of internet access (households) **Figure 2 Internet use by individuals**

Source: own processing, data by Eurostat

As seen on Figure 1, only about 80 % of households in Slovakia have internet access. That is not only far behind leading countries, but also lower percentage than in Visegrad countries. Together with around 80 % of individuals using internet (Figure 2), Slovakia is behind the average of the European Union and far behind leading countries, mostly Nordic and Benelux countries.

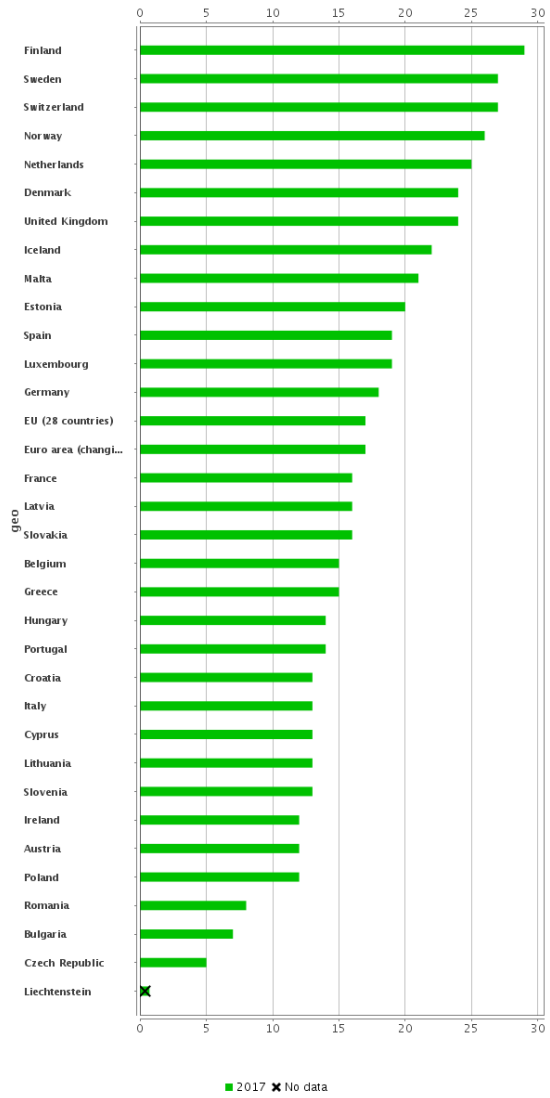


Figure 3 Individuals using the internet for job search

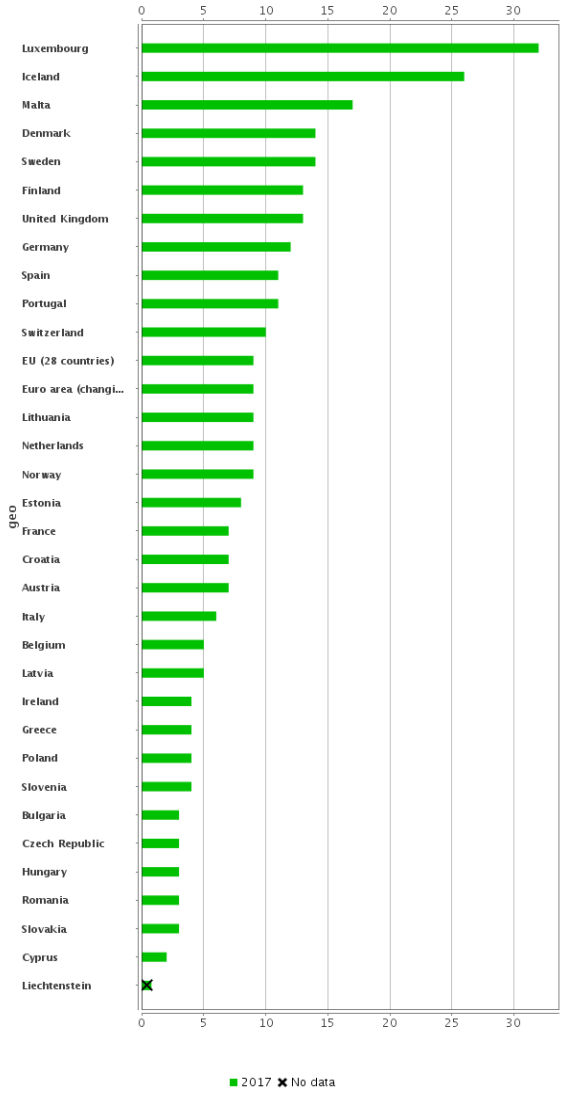


Figure 4 Individuals using the internet for online consultations

Source: own processing, data by Eurostat

While taking into consideration the use of internet for job search (Figure 3), for online consultations (Figure 4), for online courses (Figure 5) and for looking for information about education, training or course offers (Figure 6), we can see usage at around 15, 3, 4 and 30 % respectively, that is behind the average of European Union. Usage of internet for online consultations and online courses is extremely low when comparing to the leaders.

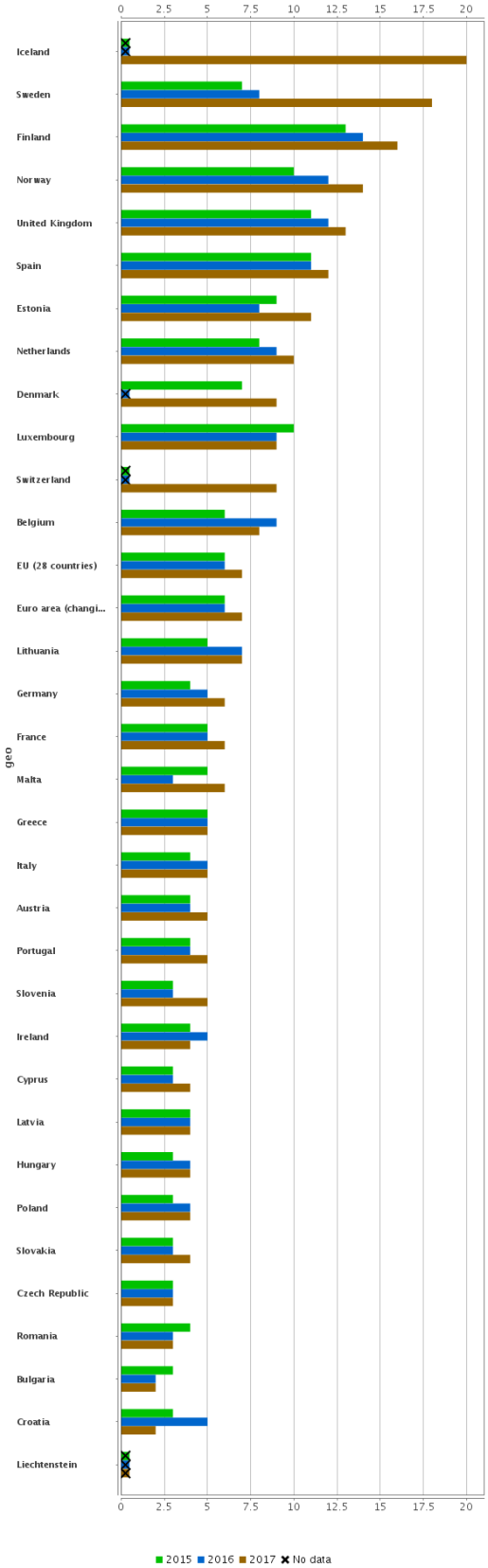


Figure 5 Individuals using the internet for online courses

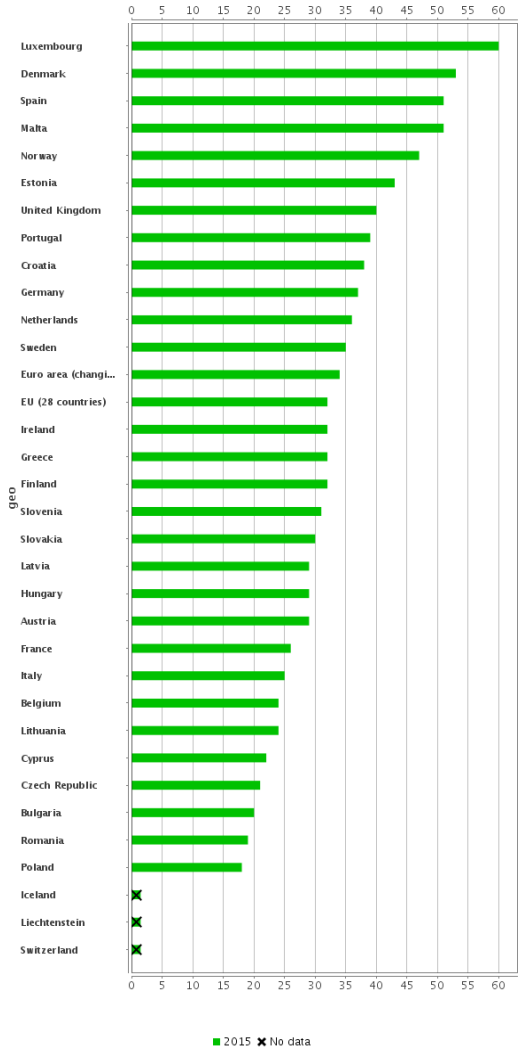


Figure 6 Individuals using the internet for looking for information about education, training or course offers

Source: own processing, data by Eurostat

The impact of the digital divide is not only in social sphere, but also on the macroeconomic level. From figures above, we have seen that Slovakia is lagging behind many European Union countries in indicators directly connected to the digital divide. Widening the digital divide within Slovakia, but also among Slovakia and other European Union countries, can have negative impact on the economy of Slovakia, while as seen from Figure 7 and Figure 8, ICT has considerable impact on GDP and employment.

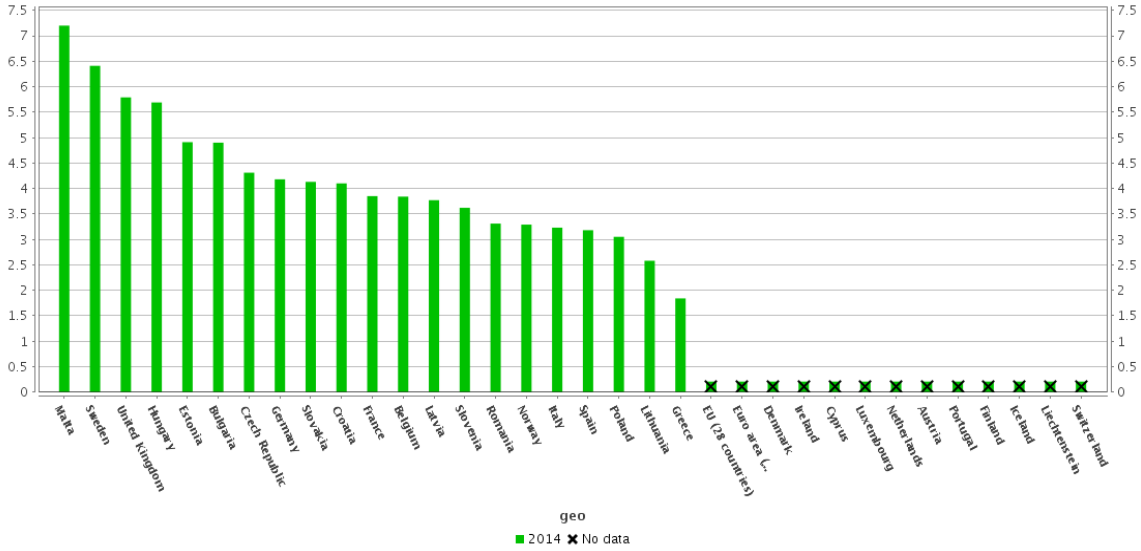


Figure 7 Percentage of the ICT sector on GDP

Source: own processing, data by Eurostat

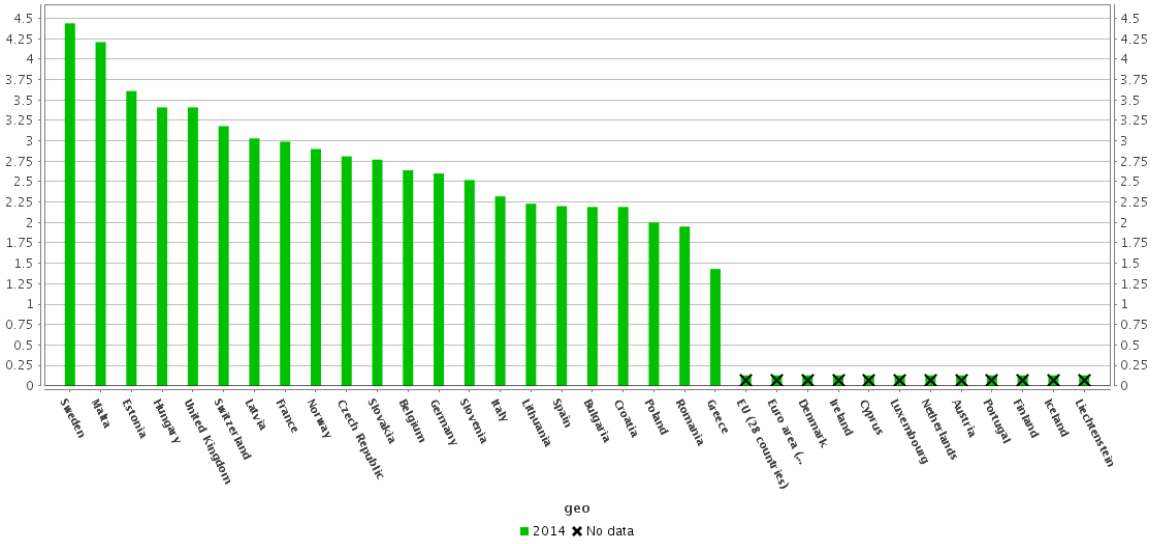


Figure 8 Percentage of the ICT personnel on total employment

Source: own processing, data by Eurostat

Conclusion

With the development of information and communication technologies, the digital divide, which represents a difference in access, use and knowledge in the field of information and communication technologies, is widening. One of the tools for narrowing, respectively reducing digital divide is the creation and development of digital public spaces. By encouraging the creation and development of digital public spaces, especially in areas with disadvantaged groups, it would be possible to help reducing the digital divide.

As seen from our analysis, ICT has considerable impact on GDP and employment. We have also seen that Slovakia is lagging behind the average of the European Union countries in various indicators directly connected to the digital divide. These findings are also supported by the European Commission's Digital Economy and Society Index that is composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness, in which Slovakia placed on 20th position from 28 European Union countries. (European Commission, 2017) By narrowing the digital divide within the country, Slovakia can not only decrease its social disparities, but also become more competitive on national level.

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GOLD PRICE EVOLUTION IN WORLD MARKETS

Miroslav KLIMEK – Zuzana HAJDUOVÁ

Abstract

The oldest metal that mankind began to process is a gold. In nature, it is almost pure as a pure metal, not as a compound. In the fifth millennium, b.c. gold began to be processed through metallurgy. Central banks still hold about 40 % of the world´s gold reserves. Gold is a precious metal that is not subject to inflation, unlike money. It is therefore an excellent asset preserving asset. The biggest gold producer in the world has been China for several years. The speed of gold production is steadily rising. It is expected that the gold price will continue to rise and therefore the Chinese government supports investment in this sector. The second largest producer of gold is Australia. The London market is the best-known market where gold is physically traded. In the past, gold has been a function of money. However, this system has failed, because of the lack of gold as a currency metal. In times of crisis, gold is once again a safe investment, and of course it increases its price. The article deals with the influence of gold production on the price of mining companies traded on the stock exchange. Describes the historical evolution of the gold price, includes general views on its future cost, and measures the correlation between gold and stock markets.

Keywords:

gold, precious metal, investment gold, the gold market, monetary gold, investment gold, gold price, investment opportunities, products comparison

Introduction

In the past, gold has served the function of transnational money without any major problems, but its lack of monetary currency has been one of the main reasons why this system has failed. Perhaps the exceptional properties of gold, such as rarity, brightness, clarity, chemical stability and so forth, and the myths associated with it, create a sense of hope and the idea that gold will work better. That´s why gold in times of crises and uncertainties is becoming a safe harbor, which, of course, increases its price in these situations.

Gold has fascinated humanity forever. It has been and still has a close connection with people until nowadays. It was a symbol of wealth and power, and it maintains this position to the present day (Struž, Studýnka, 2005, page 218).

For centuries, a fiction has been created that gold, or other precious metals, will protect humanity against inflation and help them maintain the value of property. The power of this fiction proves and confirms the behavior of people at high inflation, either after World War I and World War II, or even in the ancient past of the Roman Empire (Friedman, 1997, page 21). Gold has been part of almost all currency systems, such as bimetalism (before 1875), the classic gold standard (1875-1914), the inter-war period (1915-1944), or the Brettoon-wood system (1945-1972) (Kotlebová, Sobek, 2007, page 29).

Gold is exceptional, it has unique physical and chemical properties, it is durable, does not corrode and is not affected by the majority of chemicals, but it is also easily separable and machinable. It is characterized by natural tolerance

with the human body, which is suitable not only for medical purposes for dentists, doctors and jewelers, but gold has also been widely used in the electrical industry. All these features helped gold to gain a privileged position over the course of history, and also helped raise and maintain its value.

The extraordinary qualities of gold have helped him to gain a unique position throughout the history. Thanks to these properties, almost all the gold is still preserved. Whether in the form of artefacts and jewelery in museums, in the form of gold bars or bricks in central bank safes or in numismatic collections (Bernstein, 2004, page 20).

Methods and methodology

Regarding the methodology of work creation, the most important part was the search and gathering of relevant sources and statistical data and their subsequent study and analysis. We used the methods of analysis, synthesis, descriptions and comparisons where the analysis was a key task. In writing, we have largely drawn from internet sources, mostly foreign ones, because of the up-to-date information.

1. Influence of gold production on the price of mining companies traded on the stock exchange.
2. The effect of changing the estimate of gold reserves to the price of gold.
3. Gold mining and correlation with stock markets.

The gold offer on the market consists mainly of mining companies, international financial institutions, central banks through gold reserves, precious metals trading companies, and precious metal recycling companies. Gold mining companies make up the primary supply. The secondary supply of gold is provided mainly by central banks, governmental and multinational organizations (such as the International Monetary Fund) that hold gold reserves and gold trading companies.

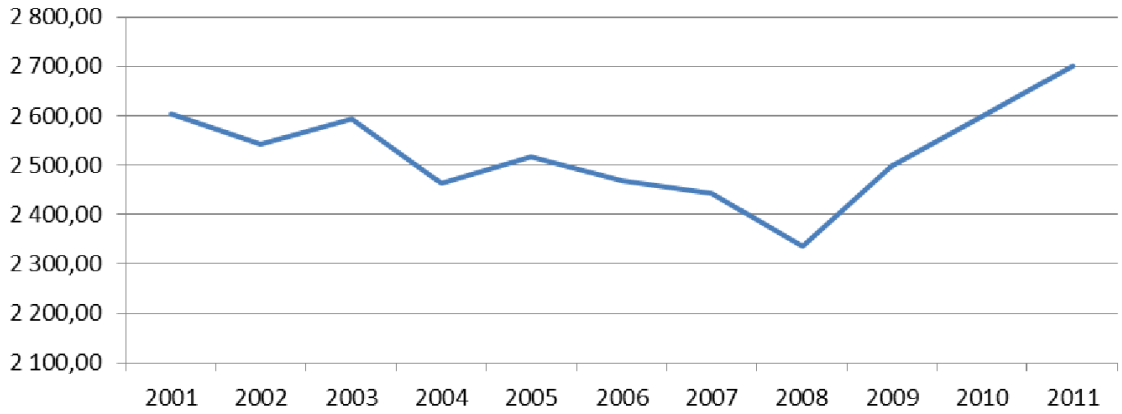

Figure 1 The Gold offer

Source: http://www.goldsheetlinks.com/

From graph number 1 we can see that by about 2009, the primary supply of gold had declined. The reasons for the decline in the primary supply of gold were several. With a stagnant gold price, mining companies did not invest in new prospects or limit their investments, limiting the implementation of new projects. Another reason was that the original gold finds were gradually utilized, or the mining in them became more complicated and thus economically less efficient. In the following section, we will point out how gold production has not stood in recent years. The reason is that resources are quickly exhausted and producers have to consider strongly whether they are willing to invest in further geological surveys and also into more and more demanding production itself. Most rocks and minerals contain gold only in a minimal amount. In the earth´s crust, there is an average of only 0,0035 grams of gold per tonne of rock. "For gold mining to be profitable under current technology and methods of mining, one tonne of rock must contain more than one gram of gold" (Struž, Studýnka, 2005, page 37).

Table 1 World inventories of gold and its production in 2009, 2010 and 2011 (in tonnes)

Country	Resources	Production		
		2009	2010	2011
Australia	7 400	222	261	270
South Africa	6 000	198	189	190
Russian Federation	5 000	191	192	200
Chile	3 400	41	38	45
USA	3 000	233	231	237
Indonesia	3 000	130	120	100
Brazil	2 400	60	58	55
Peru	2 000	182	164	150
China	1 900	320	345	355
Uzbekistan	1 700	90	90	90
Ghana	1 400	86	82	100
Mexico	1 400	51	73	85
Papua New Guinea	1 200	66	68	70
Canada	9 200	97	91	110
other countries	10 000	490	559	630
Together	**59 000**	**2 457**	**2 561**	**2 700**

Source: U.S. Geological Survey

World gold production in 2010 grew by 4 % and in 2011 by more than 5 %. It´s been the third consecutive year when world gold production grew. From this review we can see that year-on-year production increased mainly in Canada by 19 tonnes, in Mexico by 12 tonnes, in China by 10 tonnes, in Australia by 9 tonnes, and by Russia by 8 tonnes. In Indonesia, however, there was a decrease of 20 tonnes, which represents 24 % of production and also in Brazil by 3 tonnes, which represents approximately 1,75 %. However, some significant year-on-year increases were recorded mainly in 2010. 39 tonnes in Australia, 25 tonnes in China, or 22 tonnes in Mexico. Worldwide gold production continues to grow, especially in China, Australia, Canada, Chile, Mexico and Russia, which compensates for production losses in Indonesia and Peru. South Africa has ended

a nearly ten-year trend of declining gold production. Gold production in China continues to rise and the country remains at the forefront of production, followed by Australia, the United States, the Russian Federation and South Africa. In most developed countries, gold jewelery is used as an investment or protection against uncertainty to a much lesser extent than in Asia or the Middle East. Jewelery consumption is currently falling, as the price of gold continues to grow, which may be the reaction of consumers to the current economic crisis. The estimated gold price in 2011 was 30 % higher than the price in 2010. In 2011, the daily gold price ranged from a minimum of 1,322 $ / oz in January to a maximum of 1,881 $ / oz at the end of August.

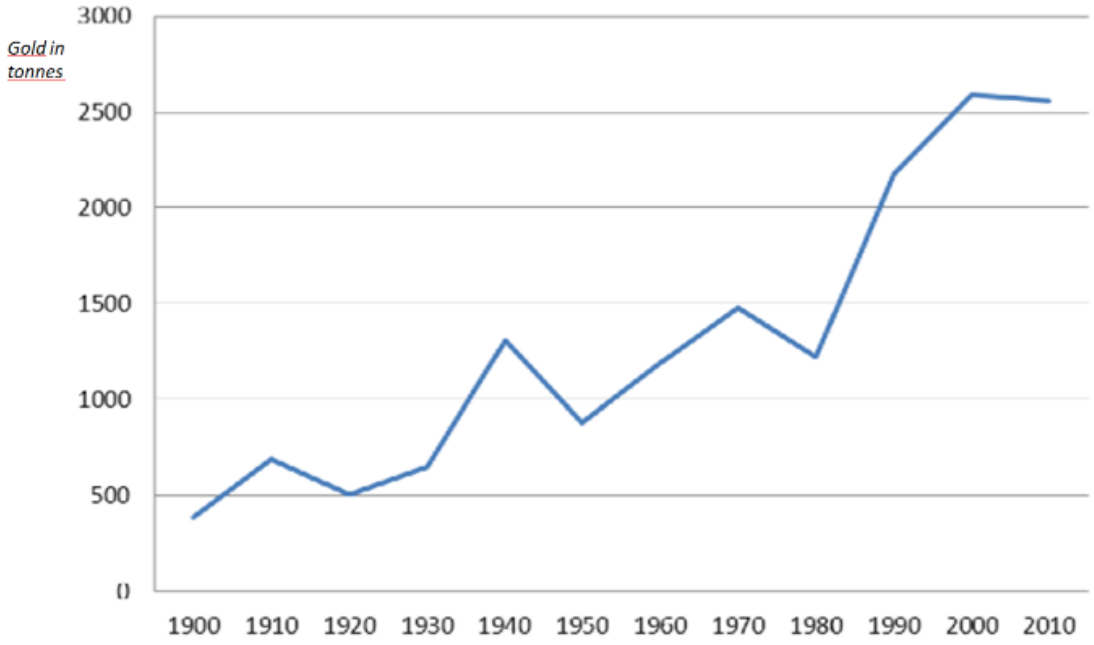

Figure 2 World production of gold in the years 1900 to 2010 (in tonnes)

Source: U.S. Geological Survey

World gold production needs high gold prices to sustain production. The high price motivates the mining company to invest more in the search for new assets, but because of uncertain sources, it is hard to estimate further developments. In addition, the fall in prices would cause an immediate fall in production, which would result in a sudden and enormous increase in the price of gold. For this reason, the gold price should continue to be maintained, respectively increase at the same pace. So we can say that the gold price is working on gold production, and the mining company decides whether or not it is worth searching for new locales at this price (http://www.dani2989.com).

It is also interesting to forecast the development of gold production by Dr. Thomas Chaize, who compares the development of gold production with population development. It states that in 2010 gold production per capita was about 0,36 grams and average production over the past 100 years was about 0,37 grams per capita. According to estimates, the world population should reach 7,2 billion in 2020 and 8,2 billion in 2030. Accordingly, in 2020 the production of

gold should be 2 803 tonnes and 3 034 tonnes in 2030. It is assumed that in the short run, gold production will continue to rise, but the estimate is that there are not so many sources of quality gold to make the extraction in the coming decades likely to grow steadily. So, if gold production goes down and the world´s population grows, it will, of course, in the long run mean that in the limited supply and rising demand there will be pressures to raise the gold price (http://www.gold-eagle.com/, 2012).

Therefore, the gold price is primarily influenced by the price increase, but also by the fact that gold deposits are currently being depleted, and the extraction of gold from the rock, where gold is very finely dispersed, is mostly hydro-metalized, which is a very demanding and costly process (US Geological Survey, 2012).

Gold is traded around the world as well as with other goods. But until the gold gets to the surface of the earth´s bowels and passes through the whole processing process, a long way goes by. Gold is traded in several cities in the world, London has the most important position. Other major cities where commodities are traded are New York, Tokyo, Hong Kong, Singapore, Zurich, Dubai and Shanghai. The London Gold Market determines its price based on trading in physical gold and its derivatives. The London Bullion Market Association (LBMA) secures the gold and silver market on the London Bullion Market. LBMA members are major traders, precious metal companies, banks, mints, and others who trade with each other. This organization has 66 regular members and 55 associate members from 26 countries. The official unit of the London market is one bar (brick, rod) equal to about 440 Troy Units, which is about 12,5 kilograms. Each bar must be labeled with the label of the designated processor. Purchase and sales prices are quoted in dollars but may also be reported on other freely convertible currencies upon request. Gold fixing is one of the most important moments in the London market. The first benchmarking of the gold price on the London market took place in 1919 at Rothsild & Sons, where the process continues to this day. At the beginning of the gold pricing process, the President will announce the opening price, which the present agents will instantly notify their dealer, and they, after agreeing with their clients, will inform them whether they accept the price or not. When an opt-in price is only interested in selling or buying, or when the offer does not match the demand, the price is reduced or increased, and the whole process is repeated until a balance is reached. When it comes to balance, the President announces that the price of gold is fixed. Thus, the price in London is set twice a day (10:30 and 15:00 London time) for 80 years (Struž, Studýnka, 2005, page 256).

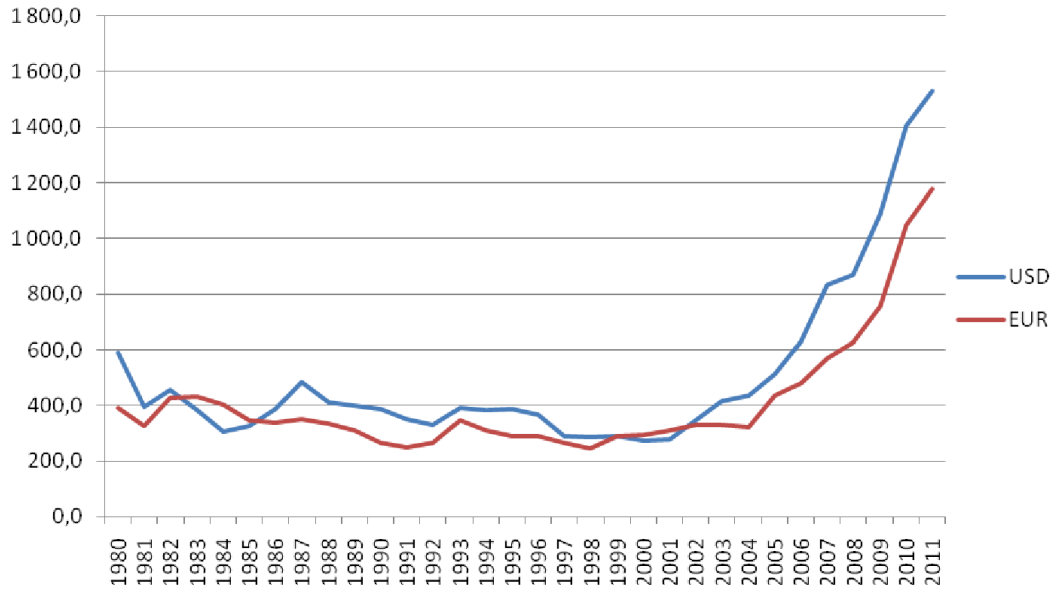

Figure 3 The price of a troy ounce of gold in dollars and euros from 1980 to 2011

Source: World Gold Council

The gold price has evolved in the world market just like all other commodities. How can we see on graph number 3, the evolution of the gold price from 1980 to 2011 has a rising character in the long run. In 1980, the price of gold rose dramatically and grew by 350 $ over three days, due to market speculation and political histories. This gold madness peaked on January 21, when the gold price reached 850 $.

The role of gold in the hands of central banks is at present to hold the position of one of the reserve assets. In the 1970s and 1980s, despite the economic and political problems of central banks and official institutions, they kept gold in unchanged amounts, up to three major exceptions. It was the United States of America, which sold over 500 tons of its reserves, until in 1982 the Gold Commision commissioner recommended that gold be sold more, the International Monetary Fund, which sold one-third of its gold, half the form auctions and half through the residences of member countries and Canada, which began a long series of gradual gold sales at the beginning of 1980. Other countries kept their gold reserves until the end of 1980, when they began to reassess the need for such a high level of gold in their gold reserves for two decades. Between 1980 and 1999, the total official stock of central bank gold fell by around 10 % (http://www.gold.org).

In the decade 1989-1999, the price of gold was falling, which was also due to the fact that some central banks of Western Europe (the Netherlands, Belgium, Austria, Switzerland and the United Kingdom) held large gold reserves and sold this gold as unrecognized, or they announced their intention to do so, pushing for a decline in their market prices, and that was the reason for the CBGA agreements (http://www.gold.org/). For example, the response to the UK Finance Ministry´s announcement in May 1999 of the intention to sell 415 tonnes of gold out of a

total of 715 tonnes in its reserves was that the market price of gold fell by 4 % (Bernstein, 2004, page 348).

On graph number 4 we see that since 2009 the price of gold has risen sharply. In the first quarter of 2009, the average price of one troy ounce of gold was 919,50 $, and in 2012 this price was 1664,80 $. On September 5, 2011, the price of gold even reached 1900 $, which can not be analyzed from the following chart, as the average annual price movements.

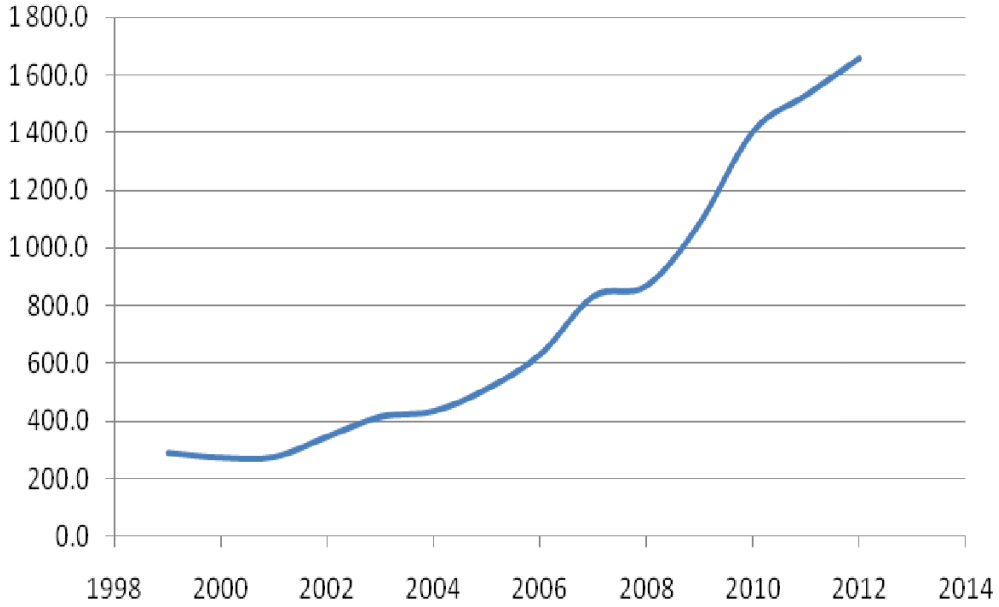

Figure 4 Gold price in 1999 - 2012 (in US dollars)

Source: World Gold Council

The 1998 annual report of the Banque de France states that "Gold remains the basis of long-term confidence in the menu ..." or "gold reserves are primarily politically a symbol of monetary sovereignty and political security in the event of a collapse of the international monetary system" (Bernstein, 2004, page 348). Chovancová says that "while in the time of financial uncertainty (as evidenced by the present) the classical diversifiers of financial assets (e.g. securities) fail, a smaller proportion of gold in the portfolio significantly improves the profitability of the portfolio" (Chovancová, 2009, page 2). As in history, we can see today that gold really plays an important role in times of crisis and uncertainty when central banks, investors, or citizens themselves are looking for security just in gold.

The basic factor affecting the price of gold is the ratio between supply and demand. The historical monetary function of gold has not completely ceased to exist either by the formal abolition of gold money, and therefore the demand for this commodity consists of two partial queries. The first is the demand for commodities as such - from industry and jewelry manufacturers. The second is monetary, the investment demand for gold as the value preserver. It is precisely this demand, recently identified by the financial and economic crisis, that it has begun to influence the price of gold more significantly.

Total demand in tonnes by sector (jewelery, industry, investment in wares and coins, ETF funds, central bank transactions) can be seen in the following figure - graph number 5. It is clear that demand for investment gold has increased in recent years.

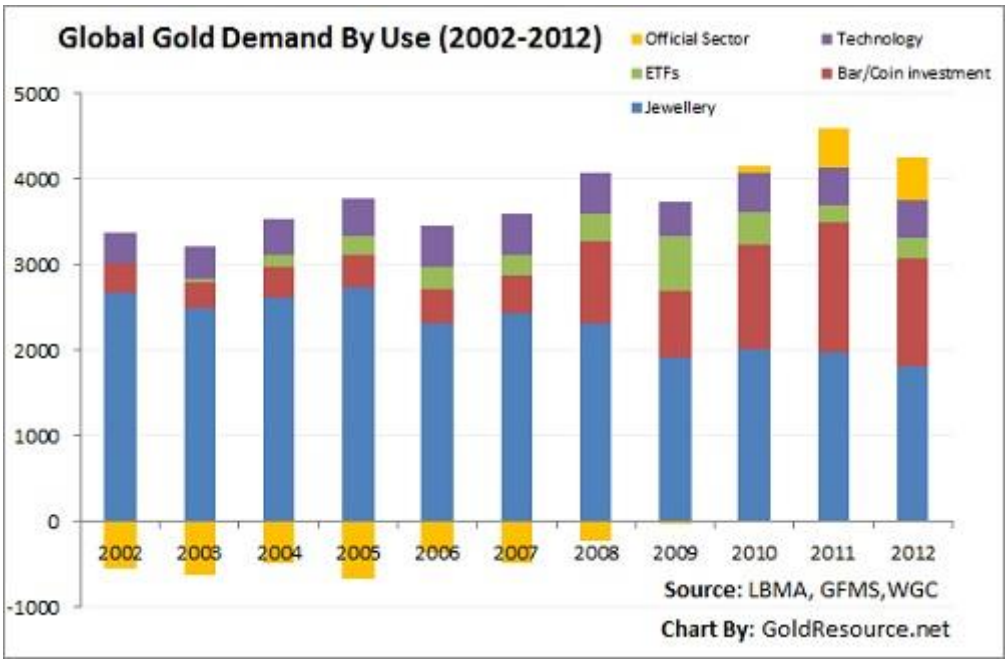

Figure 5 Demand for gold in tonnes by sector since 2002

Source: Gold Resource, 2013

Conclusion

Since 2007, the world has experienced a period of considerable economic and financial volatility during which the price of gold has more than doubled. This gives incentives for consideration of the reassessment of gold as an investment tool. Gold can keep its real value in the long run, but short-term factors can affect its price change. Such factors may be, for example, financial stress, political decisions, real interest rates, inflation, central bank activity, or currency rate changes, and especially the US dollar rate that is perceived as a global currency. It should be remembered that they are short-term shocks that affect the price of gold and their effects tend to be relatively sluggish. Gold has been used as a preserver since ancient times. In the seventeenth century, it was formally traded with it, and in the nineteenth century it was the basis for the largest exchange rate system when the world became aware of the Gold Standard. In the twentieth century it was again used as the backbone of the formal exchange rate mechanism in the Bretton-woods system, but the collapse of this system in 1971 left the role of the monetary system for more than 250 years. The popularity of gold as a currency and a value preserver is associated with history and its characteristics. Unlike other commodities, gold maintains immeasurability and durability, which gives it the position of a long-term value keeper. Another important feature of

gold is relatively less significant use for industrial purposes, compared to other commodities, including other precious metals such as silver or platinum. Only about 10 % of gold demand is used in industry. Gold is also unusual among financial assets where it does not provide returns such as dividends, shares and bonds, which can be perceived as a barrier to its holding, but on the other hand it may have advantages compared to other financial assets with a high degree of risk . The tendency for gold to maintain its true value over a long period of time leads to investing in gold as to inflation security. But reality is more complex because the price of gold does not always move in line with the price level, even in many cases it moves without any apparent connection to inflationary trends. During the dollar slackening, which raises concerns over possible inflationary pressures.

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ANALYSIS OF PROPORTION OF POPULATION HAVING USED PRESCRIBED AND NON-PRESCRIBED MEDICINES IN THE EU

Silvia MEGYESIOVÁ – Vanda LIESKOVSKÁ – Cyril ZÁVADSKÝ – Anna ROZKOŠOVÁ

Abstract
The European Health Interview Survey provides information of health evidence of all EU member countries, especially about health status divided to many characteristics, health determinants, and information about health care use. This amount and diversity of results provides a broad basis for research. The main aim of the presented article is to detect the association between some socio-economic indicators and proportion of population having used prescribed or non-prescribed medicine. The datasets from the European Health Interview Survey 2014 are available from Eurostat. In general, the fact is that women used medicine more likely than men did. The existence of gender gap is typical form many socio-economic characteristics including health status, health indicators. We assume that proportion of population having used prescribed or non-prescribed medicines should be higher for older age population what is related with deteriorating health state caused by aging.

Keywords:
Health Interview Survey, prescribed medicines, life expectancy, gross domestic product

Introduction

The European Health Interview Survey (EHIS) is a general population survey that provides information on health status, health care use, health determinants and healthcare activities in the EU (Commission Regulation No 141/2013). EHIS targets the population aged at least 15 and living in private households. The first wave of the EHIS was conducted between 2006 and 2009 without any binding Commission regulation. The second wave was held between 2013 and 2015 and the survey should be run at a regular five-year interval beginning in 2019 (Eurostat, Statistics Explained). The information collected from EHIS survey are often used for implementation into the national health information systems (Lange et. Al, 2017)

For the article purposes, the self-reported use of prescribed medicines and self-reported use of non-prescribed medicines by sex dataset were used from the EHIS second wave of survey. The main goal of the article is to discover whether there exists some association between use of prescribed or non-prescribed medicines and some other selected socio-economic characteristics, like gross domestic product per capita or live expectancy of population at certain age. The association was calculated for the chosen indicators and so it can give the readers more accurate view to existing relation between some socio-economic characteristics. More detailed information about association between selected socio-economic variables can be found in works of Khan et al. (2016), Megyesiova & Lieskovska (2014), Laskowska (2015).

1 Proportion of population having used prescribed and non-prescribed medicines

The self-reported use of prescribed medicines is the proportion of the population aged at least 15 who used medicines prescribed by a doctor during a two-week period prior to the survey.

Table 1 Self-reported use of prescribed medicines in %, 2014

EU countries	Ranking	Total	Male (M)	Female (F)	Difference (F - M)
BE	1	*60.2*	53.6	66.2	12.6
PT	2	*56.1*	48.6	62.7	14.1
LU	3	*55.4*	52.6	58.2	5.6
CZ	4	*54.9*	48.8	60.5	11.7
FI	5	*54.6*	50.2	58.7	8.5
DE	6	*53.4*	49.4	57.2	7.8
ES	7	*53.1*	46.2	59.6	13.4
UK	8	*53.0*	48.6	56.8	8.2
FR	9	*52.4*	47.3	57.1	9.8
HU	10	*49.8*	43.2	55.7	12.5
AT	11	*49.0*	43.4	54.2	10.8
EU-28	**average**	***48.6***	**43.5**	**53.3**	**9.8**
PL	12	*48.0*	41.2	53.7	12.5
HR	13	*47.7*	42.7	52.2	9.5
EL	14	*47.4*	41.5	52.8	11.3
SE	15	*46.9*	40.7	53.1	12.4
MT	16	*46.5*	42.8	50.2	7.4
DK	17	*46.1*	42.9	49.2	6.3
SI	18	*45.8*	40.8	50.6	9.8
NL	19	*45.6*	42.0	49.2	7.2
SK	20	*45.0*	38.5	51.0	12.5
IE	21	*43.4*	40.9	45.8	4.9
EE	22	*41.8*	35.9	46.8	10.9
LV	23	*41.4*	30.7	49.9	19.2
LT	24	*40.2*	32.1	46.8	14.7
BG	25	*39.4*	34.1	44.0	9.9
IT	26	*38.4*	34.1	42.3	8.2
CY	27	*36.3*	34.7	37.7	3.0
RO	28	*22.8*	18.3	26.9	8.6

Source: Eurostat, own calculations

Country codes: BE-Belgium, BG-Bulgaria, CZ-Czech Republic, DK-Denmark, DE-Germany, EE-Estonia, IE-Ireland, EL-Greece, ES-Spain, FR-France, HR-Croatia, IT-Italy, CY-Cyprus, LV-Latvia, LT-Lithuania, LU-Luxembourg, HU-Hungary, MT-Malta, NL-the Netherlands, AT-Austria, PL-Poland, PT-Portugal, RO-Romania, SI-Slovenia, SK-Slovakia, FI-Finland, SE-Sweden, UK-the United Kingdom

The proportion ranged from 22.8 % to 60.2 % with an average level for all EU members of 48.6 % (see Table 1). The share higher than 50 % was reached in 9 EU countries, between these group of countries only one country belongs to the so called “new” member states. In Czechia the proportion of people having used prescribed medicines was as high as 54.9 %. All together 11 new Member States had the share lower than the EU average. The ratio lower than 40 % was reached

in Bulgaria (39.4 %), Italy (38.4 %), Cyprus (36.3 %) and Romania (22.8 %). In each Member State women were more likely than men to have used prescribed medicines. The gender gap was highest in Latvia where the share of women that used prescribed medicine was by 19.2 percentage points (p.p.) higher than the proportion of men. The gender gap was high also in Lithuania (14.7 p.p.), Portugal (14.1 p.p.), Spain (13.4 p.p.). On the other hand, very low gender gap was typical for Luxemburg (5.6 p.p.), Ireland (4.9 p.p.) and Cyprus (3.0 p.p.)

Table 2 Self-reported use of prescribed medicines in the age group 65 years and over (%), 2014

EU countries	**Ranking**	**age_65+**	**age_65+, M**	**age_65+, F**	**65+ (F - M)**
CZ	1	92.1	91.2	92.7	1.5
PT	2	*90.5*	87.2	92.8	5.6
ES	3	*89.9*	87.1	92.0	4.9
BE	4	*89.4*	88.1	90.4	2.3
HU	5	*88.6*	85.7	90.3	4.6
EL	6	*88.5*	85.9	90.5	4.6
SK	7	*88.4*	83.4	91.5	8.1
LU	8	*87.6*	89.0	86.6	-2.4
PL	9	*87.6*	83.3	90.3	7.0
DE	10	*86.4*	85.8	86.9	1.1
SI	11	*85.7*	82.4	88.0	5.6
FR	12	*85.0*	84.8	85.1	0.3
HR	13	*84.5*	81.9	86.1	4.2
CY	14	*84.4*	82.0	86.5	4.5
AT	15	*84.0*	80.9	86.3	5.4
UK	16	*83.5*	83.5	83.5	0.0
FI	17	*82.4*	80.3	84.1	3.8
EU-28	**average**	***82.2***	**80.5**	**83.5**	**3.0**
LT	18	*82.0*	76.2	85.0	8.8
MT	19	*81.5*	77.4	84.7	7.3
IE	20	*80.2*	78.3	81.9	3.6
SE	21	*79.9*	77.0	82.4	5.4
DK	22	*79.5*	79.4	79.5	0.1
NL	23	*79.4*	78.5	80.2	1.7
BG	24	*79.1*	75.7	81.4	5.7
EE	25	*78.3*	72.2	81.4	9.2
LV	26	*75.8*	66.8	80.0	13.2
IT	27	*65.3*	62.9	67.2	4.3
RO	28	*61.1*	57.3	63.6	6.3

Source: Eurostat, own calculations

Most of the people aged 65 and over are, due to some illnesses, using some kind of prescribed medicine. The proportion of population using prescribed medicines in the older age group (65 years and over) was very high and averaged at 82.2 % for the 28 EU countries (see Table 2). The highest levels belonged to Czech Republic (92.1 %), Portugal (90.5 %) and Spain (89.9 %). In contrary with the total share of population, using prescribed medicine in the older aged group only 6 new Member States had the proportion lower than the overall average level.

Lowest share of older population using prescribed medicine was in Italy (65.3 %) and Romania (61.1 %). The gender gap of the older population (EU average 3.0 p.p) was not so extremely high than the gender difference of the entire population (9.8 p.p.). The gender gap lower than 1 percentage points was achieved in France, Denmark and the United Kingdom. Only in one EU country, namely in Luxemburg, in the older age group the proportion of women using prescribed medicine was lower than the share of men and so the gender gap is negative (-2.4 p.p.)

Table 3 Self-reported use of non-prescribed medicines in %, 2014

EU countries	**Ranking**	**Total**	**Male (M)**	**Female (F)**	**Difference (F - M)**
FI	1	70.4	59.6	80.0	20.4
LT	2	*56.8*	46.7	65.2	18.5
DK	3	*55.9*	48.1	63.6	15.5
LV	4	*54.0*	43.0	62.7	19.7
PL	5	*51.8*	42.6	59.5	16.9
HU	6	*47.3*	41.7	52.3	10.6
CZ	7	*46.1*	36.7	54.8	18.1
EE	8	*46.1*	37.1	53.7	16.6
SK	9	*44.3*	35.3	52.7	17.4
UK	10	*43.3*	37.3	48.5	11.2
DE	11	*42.9*	35.9	49.5	13.6
SE	12	*40.0*	34.8	45.2	10.4
NL	13	*39.5*	31.5	47.3	15.8
BG	14	*37.1*	30.1	43.3	13.2
EU-28	**average**	***34.6***	**28.9**	**39.8**	**10.9**
LU	15	*34.6*	30.6	38.5	7.9
AT	16	*34.3*	28.1	40.2	12.1
MT	17	*33.3*	28.6	38.1	9.5
SI	18	*32.9*	28.1	37.5	9.4
IE	19	*31.9*	25.9	37.7	11.8
HR	20	*31.0*	25.2	36.1	10.9
EL	21	*27.5*	23.3	31.2	7.9
FR	22	*27.1*	21.6	32.1	10.5
PT	23	*23.9*	22.5	25.1	2.6
ES	24	*21.9*	19.5	24.2	4.7
CY	25	*20.8*	15.6	25.4	9.8
IT	26	*19.7*	16.7	22.4	5.7
BE	27	*19.1*	16.7	21.3	4.6
RO	28	*15.2*	11.0	19.1	8.1

Source: Eurostat, own calculations

The self-reported use of non-prescribed medicines is the proportion of the population aged at least 15 who used any medicines or dietary supplement, or herbal medicines or vitamins not prescribed or recommended by doctor in the past 2 weeks (Eurostat, Statistics Explained). According the proportions of people using non-prescribed medicine in Tables 3 and 4 the rates are lower comperes with proportion of the population using prescribed medicine especially in the age group of 65 years and over. The overall EU average of share of population using

non-prescribed medicine reached 34.6 % compared to 48.6 % of population using prescribed medicine. Very high was the level of proportion in Finland, where the maximum share was as high as 70.4 %. In the same country, the gender gap reached its highest level of 20.4 p.p. which is in contrary with the lowest gender difference of Portugal (2.6 p.p.).

Table 4 Self-reported use of non-prescribed medicines in the age group 65 years and over (%), 2014

EU countries	Ranking	age_65+	age_65+, M	age_65+, F	65+ (F - M)
LT	1	69.0	60.7	73.3	12.6
FI	2	*67.5*	57.3	75.5	18.2
LV	3	*62.6*	54.3	66.4	12.1
DK	4	*61.5*	54.8	67.3	12.5
SK	5	*58.0*	48.7	63.7	15.0
PL	6	*54.1*	46.7	58.7	12.0
CZ	7	*52.8*	44.9	58.6	13.7
EE	8	*52.2*	44.5	56.1	11.6
HU	9	*51.6*	46.8	54.6	7.8
BG	10	*49.8*	43.7	53.8	10.1
DE	11	*39.4*	34.1	43.6	9.5
HR	12	*38.5*	37.1	39.5	2.4
UK	13	*38.4*	33.2	42.7	9.5
NL	14	*37.7*	29.2	44.9	15.7
MT	15	*33.4*	27.3	38.2	10.9
SI	16	*31.8*	26.5	35.4	8.9
EU-28	**average**	***31.7***	**26.8**	**35.4**	**8.6**
AT	17	*31.4*	24.1	37.1	13.0
SE	18	*30.2*	27.5	32.4	4.9
LU	19	*29.1*	27.5	30.3	2.8
EL	20	*27.9*	24.1	30.9	6.8
IE	21	*23.9*	19.2	27.9	8.7
CY	22	*20.6*	18.6	22.3	3.7
RO	23	*20.4*	18.1	21.9	3.8
FR	24	*20.0*	17.1	22.3	5.2
PT	25	*17.9*	15.1	19.9	4.8
BE	26	*17.7*	16.2	18.8	2.6
IT	27	*15.7*	12.9	17.9	5.0
ES	28	*13.9*	11.2	16.0	4.8

Source: Eurostat, own calculations

The difference between the proportions of population using prescribed and non-prescribed medicine was very high in the older group of population. At the age of 65 and over the average level of share of people having used prescribed medicine stood at 82.2 % while the ratio of people having used non-prescribed medicine was only 31.7 %. Most of the new Member States have reached higher proportion levels than the older member countries. Eleven out of 13 new Member States had the proportion higher than the average level of EU. It means that the population in countries with a lower GDP per capita, in countries with a lower living standard, the population used more often some kind of non-prescribed –

self paid medicines. It seems that possibly a different practice among Member States exists in prescribing and reimbursing different groups of medicines, for example concerning the use of supplements such as vitamins, minerals which are not necessarily related to the treatment of diseases can exist (Eurostat, Statistics Explained). This statement can be visible from the data set presented in Table 4.

2 Association of selected indicators

The association between some socio-economic indicators can be measured using Pearson´s correlation coefficient or Spearman´s rank correlation coefficient. As an indicator of country´s productivity level the gross domestic product per capita was used, this indicator can be used as a measure of living standard of the EU countries (Mareli & Signorelli, 2010, Cacheux & Laurent, 2015).

Gross domestic product per capita in purchasing power standards (GDP/capita in PPS) is positively and significantly correlated with life expectancies (LE) presented in table 5. The coefficient of correlation is higher in case of men´s LE compared with LE for women. In both cases, the correlation for male (LE at age of 15-year-old persons and LE at age of 65 years old persons) and GDP per capita reached a level higher than 0.57. But also the association between GDP per capita and LE for females is statistically significant, although the correlation is moderate. According the presented measures of association in Table 5 it is clear, that in an EU country with a higher GDP per capita we can expect a higher LE of both sexes.

Table 5 Coefficient of correlation between GDP per capita and life expectancies

Pearson Correlation Coefficients, N = 28 **Prob > |r| under H0: Rho=0**					
	GDP/capita	**LE_15_M**	**LE_15_F**	**LE_65_M**	**LE_65_F**
GDP/capita	1.00000	0.57993 0.0012	0.49213 0.0078	0.57317 0.0014	0.47068 0.0115
LE_15_M	0.57993 0.0012	1.00000	0.90245 <.0001	0.97711 <.0001	0.83344 <.0001
LE_15_F	0.49213 0.0078	0.90245 <.0001	1.00000	0.95125 <.0001	0.98097 <.0001
LE_65_M	0.57317 0.0014	0.97711 <.0001	0.95125 <.0001	1.00000	0.91355 <.0001
LE_65_F	0.47068 0.0115	0.83344 <.0001	0.98097 <.0001	0.91355 <.0001	1.00000

Source: Eurostat, own calculations

The association of GDP per capita and the share of population having used prescribed medicines is presented in Table 6. Statistically significant is only the rank correlation coefficient (Spearman´s correlation coefficient) between GDP per capita and the share of males having used prescribed medicines (p value = 0.0032). Naturally statistically significant are also the correlation coefficients between the proportion of self-reported use of prescribed medicines between males and females.

Table 6 Coefficient of correlation between GDP per capita and self-reported use of prescribed medicines (males and females: total and 65 years old)

Spearman Correlation Coefficients, N = 28 Prob > |r| under H0: Rho=0					
	GDP/capita	**Pmed M**	**Pmed F**	**Pmed_65+M**	**Pmed_65+F**
GDP/capita	1.00000	0.53663 0.0032	0.28591 0.1402	0.21109 0.2809	-0.07107 0.7193
Pmed M	0.53663 0.0032	1.00000	0.87596 <.0001	0.78155 <.0001	0.50534 0.0061
Pmed F	0.28591 0.1402	0.87596 <.0001	1.00000	0.82206 <.0001	0.69537 <.0001
Pmed_65+M	0.21109 0.2809	0.78155 <.0001	0.82206 <.0001	1.00000	0.86313 <.0001
Pmed_65+F	-0.07107 0.7193	0.50534 0.0061	0.69537 <.0001	0.86313 <.0001	1.00000

Source: Eurostat, own calculations

In Table 7 the rank correlation coefficients of GDP per capita in PPS and the share of both sexes having used non-prescribed medicines are visible. According the p value of the statistical tests for the Spearman´s correlation coefficient, it is clear that between both values does not exist statistically significant association. Again, a strong association exists between the proportion of self-reported use of non-prescribed medicines between males and females.

Table 7 Coefficient of correlation between GDP per capita and self-reported use of non-prescribed medicines (males and females: total and 65 years old)

Spearman Correlation Coefficients, N = 28 Prob > |r| under H0: Rho=0					
	GDP/capita	**nonPmed M**	**nonPmed F**	**nonPmed_65+M**	**nonPmed_65+F**
GDP/capita	1.00000	0.01862 0.9251	0.00684 0.9724	-0.21471 0.2726	-0.18538 0.3450
nonPmed M	0.01862 0.9251	1.00000	0.97482 <.0001	0.91607 <.0001	0.91663 <.0001
nonPmed F	0.00684 0.9724	0.97482 <.0001	1.00000	0.93512 <.0001	0.95306 <.0001
nonPmed_65+M	-0.21471 0.2726	0.91607 <.0001	0.93512 <.0001	1.00000	0.97769 <.0001
nonPmed_65+F	-0.18538 0.3450	0.91663 <.0001	0.95306 <.0001	0.97769 <.0001	1.00000

Source: Eurostat, own calculations

According the Spearman´s rank correlation coefficients presented in tables 8 and 9 a statistically significant, negative association between life expectancies of older men (Table 8) or older women (Table 9) and the proportion of men or women in the same age group having used non-prescribed medicines was discovered. The negative correlation coefficient means that in countries with higher LE for both sexes we can expect a lover proportion of people having used non-prescriebed medicine.

Table 8 Rank correlation between LE at age 65 and self-reported use of prescribed and non-prescribed medicines (males)

Spearman Correlation Coefficients, N = 28 Prob > |r| under H0: Rho=0			
	LE_65_M	**Pmed_65+M**	**nonPmed_65+M**
LE_65_M	1.00000	0.26802 0.1679	-0.60143 0.0007
Pmed_65+M	0.26802 0.1679	1.00000	-0.18560 0.3444
nonPmed_65+M	-0.60143 0.0007	-0.18560 0.3444	1.00000

Source: Eurostat, own calculations

Table 9 Rank correlation between LE at age 65 and self-reported use of prescribed and non-prescribed medicines (females)

Spearman Correlation Coefficients, N = 28 Prob > |r| under H0: Rho=0			
	LE_65_F	**Pmed_65+F**	**nonPmed_65+F**
LE_65_F	1.00000	0.16505 0.4013	-0.53479 0.0034
Pmed_65+F	0.16505 0.4013	1.00000	-0.15058 0.4444
nonPmed_65+F	-0.53479 0.0034	-0.15058 0.4444	1.00000

Source: Eurostat, own calculations

Conclusion

The proportion of people having used prescribed medicines varies in from 22.8 % to 60.2 % but in the group of people aged 65 and over the share ranged from a minimum of 61.1 % in Romania to 92.1 % in Czech Republic. The gender gap of share of population having used prescribed medicines averaged at 9.8 p.p. for the total EU population (aged at least 15) and averaged only 3.0 p.p. for the older persons. The gender gap of the ratio of people having used non-prescribed medicines was not so significantly different between the total population (10.9 p.p.) and older population (8.6 p.p.). The population aged 65 and over used mostly prescribed medicines compared to non-prescribed medicines. The overall average proportion of people having used prescribed medicines at age 65 and over was as high as 82.2 % compare to 31.7 % of population having used non-prescribed medicines.

GDP per capita was significantly and positively correlated with life expectancies for both sexes. Statistically significant is also the rank correlation (Spearman´s correlation coefficient) between GDP per capita and the share of males having used prescribed medicines. It does not exist any significant relation between GDP per capita in PPS and the share of both sexes having used non-prescribed medicines. Statistically significant, negative association between life expectancies of older men or older women and the proportion of men or women in the same age group having used non-prescribed medicines was discovered.

Acknowledgment

This paper was supported by the Slovak Scientific Grant Agency as part of the research project VEGA 1/0376/17.

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THE IMPORTANCE OF DIGITAL ECONOMY AND THE DIGITAL ECONOMY AND SOCIETY INDEX

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Abstract
Trends in technology are constantly changing. Every area is a subject to change, from the automotive industry, through education, health, public sector or agriculture. The technology sector is a place of permanent change. The digital transformation does not represent the transfer of paper documents to their digital version. Digital transformation is a new industrial revolution. It is a unique opportunity to change or modify a business using technology available or upgraded. This paper aims to give a closer look at the digital economy issues, addressing the DESI index and its individual dimensions.

Keywords:
digital transformation, digital economy, digital dimensions, index, DESI

Introduction

The digital economy is the worldwide network of economic activities, commercial transactions and professional interactions that are enabled by information and communications Technologies. It can be succinctly summed up as the economy based on digital technologies.

Don Tapscott first coined the term digital economy in his 1995 best-selling book *The Digital Economy: Promise and Peril in the Age of Networked Intelligence.*

Nicholas Negroponte, founder of the Massachusetts Institute of Technology's Media Lab and author of the 1995 book Being Digital, has described the digital economy as using "bits instead of atoms."

In its earliest days, the digital economy was sometimes called the internet economy, the new economy or the web economy due to its reliance on internet connectivity. However, economists and business leaders assert that the digital economy is more advanced and complex than the internet economy, which, under one definition, simply means economic value derived from the internet.

The digital economy reflects the move from the third industrial revolution to the fourth industrial revolution. The third industrial revolution, sometimes called the digital revolution, refers to the changes that happened in the late 20th century with the transition from analog electronic and mechanical devices to digital technologies. The fourth industrial revolution builds on the digital revolution as technologies today continue to bridge the physical and cyberworlds.

1 The Importance of digital economy

Although some organizations and individuals use technologies to simply execute existing tasks on the computer, the digital economy is more advanced than that. It is not simply using a computer to perform tasks traditionally done manually or on analog devices. Instead, the digital economy highlights the opportunity and the need for organizations and individuals to use technologies to execute those tasks better, faster and often differently than before.

Moreover, the term reflects the ability to leverage technologies to execute tasks and engage in activities that weren't possible in the past. Such opportunities for existing entities to do better, to do more, to do things differently and to do new things is encompassed in the related concept of digital transformation.

The digital economy reflects the move from the third industrial revolution to the fourth industrial revolution. The third industrial revolution, sometimes called the digital revolution, refers to the changes that happened in the late 20th century with the transition from analog electronic and mechanical devices to digital technologies. The fourth industrial revolution builds on the digital revolution as technologies today continue to bridge the physical and cyberworlds.

2 The structure of the Digital Economy and Society Index

The Digital Economy and Society Index (DESI) measures progress of EU countries towards a digital economy and society. As such, it brings together a set of relevant indicators on Europe's current digital policy mix. The index allows four main types of analysis:

- General performance assessment: to obtain a general characterisation of the performance of individual Member States by observing their overall index score and the scores of the main index dimensions.
- Zooming-in: to pinpoint the areas where Member State performance could be improved by analysing the scores of the index's sub-dimensions and individual indicators.
- Follow-up: to assess whether there is progress over time.
- Comparative analysis: to cluster Member States according to their index scores, comparing countries in similar stages of digital development so as to flag the need for improvement in relevant policy areas.

The DESI was developed following the guidelines and recommendations in the OECD's "Handbook on constructing composite indicators: methodology and user guide". The data included in the index were mostly collected by the European Commission services (DG CNECT, Eurostat) and by ad-hoc studies launched by the Commission services.

The DESI has a three-layer structure as depicted in figure 1. It is composed of 5 principal dimensions, each divided in a set of sub-dimensions, which are in turn composed by individual indicators.

Dimension	Sub-dimension	Indicator
1 Connectivity	1a Fixed Broadband	1a1 Fixed Broadband Coverage
		1a2 Fixed Broadband Take-up
	1b Mobile Broadband	1b1 Mobile Broadband Take-up
		1b2 4G coverage
		1b3 Spectrum
	1c Speed	1c1 NGA Coverage
		1c2 Subscriptions to Fast Broadband
	1d Affordability	1d1 Fixed Broadband Price
2 Digital Skills	2a Basic Skills and Usage	2a1 Internet Users
		2a2 At Least Basic Digital Skills
	2b Advanced skills and Development	2b1 ICT Specialists
		2b2 STEM Graduates
3 Use of Internet	3a Content	3a1 News
		3a2 Music, Videos and Games
		3a3 Video on Demand
	3b Communication	3b1 Video Calls
		3b2 Social Networks
	3c Transactions	3c1 Banking
		3c2 Shopping
4 Integration of Digital Technology	4a Business digitisation	4a1 Electronic Information Sharing
		4a2 RFID
		4a3 Social Media
		4a4 eInvoices
		4a5 Cloud
	4b eCommerce	4b1 SMEs Selling Online
		4b2 eCommerce Turnover
		4b3 Selling Online Cross-border
5 Digital Public Services	5a eGovernment	5a1 eGovernment Users
		5a2 Pre-filled Forms
		5a3 Online Service Completion
		5a4 Open Data

Figure 1 DESI Structure

Source: DESI 2017, Digital Economy and Society Index, Methodological note, Updated: 2 March, 2017

At high level the DESI addresses the five principal policy areas of concern for a digital economy and society. These are not isolated areas that contribute separately to digital development but are in fact interconnected. As such, developments in the digital economy cannot be achieved through isolated improvements in particular areas but through concerted improvement in all areas. For the methodological and data availability reasons, DESI 2017 presents structural changes when compared to DESI 2016.

2.1 Connectivity dimension

A necessary condition for the development of a digital society is the ability of its members to connect to the Internet. Nowadays however, a simple Internet connection is no longer sufficient. In order to benefit from the full spectrum of developments brought about by the Internet, a high–speed Internet connections starts to be desirable, if not mandatory. Hence connectivity is a necessary infrastructure of the digital economy and society. The Connectivity dimension is

divided into four sub-dimensions, each focusing on a relevant aspect of connectivity to the Internet:

Fixed Broadband – focuses on whether citizens have the possibility to connect to the Internet via a fixed broadband connection, and on the extent to which they do in fact connect to the Internet that way. These phenomena are captured respectively by the Fixed BB Coverage and by the Fixed BB Take-up indicators.

Mobile Broadband – focuses on whether citizens use the broadband capabilities of their mobile devices (Mobile BB Take-up indicator), on how widely 4G services are available Digital Economy and Society Index 2017 Page 8 (4G coverage) and on whether each member state is taking the necessary steps to release and put to use the necessary radio-frequency spectrum to enable wireless broadband Internet service (Spectrum indicator).

Speed – focuses on the availability and use of high-speed Internet connections (defined as those offering at least 30 Mbps download speed). The availability of such connections is captured in the NGA Coverage indicator, whereas the actual use of such connections by the population is captured in the Subscriptions to Fast broadband (BB) indicator.

Affordability – measures how affordable it is to have a broadband Internet connection by means of the Fixed broadband (BB) price indicator, which captures the minimum price that a potential user would have to pay to obtain a basic fixed broadband connection (allowing at least 12 Mbps) as a percentage of her gross income.

2.2. Human Capital dimension

Having a connection to the Internet is not sufficient; it must be paired with the appropriate skills to take advantage of the Internet and of the myriad of possibilities unravelled by a digital society. Those skills go from basic usage skills that enable individuals to take part in the digital society and consume digital goods and services, to advanced skills that empower the workforce to develop new digital goods and services and to take advantage of technology for enhanced productivity and economic growth. Digital skills are also a necessary infrastructure for the digital economy and society. The Human Capital dimension is divided into two sub-dimensions:

Basic Skills and Usage – captures the digital skills level of the general population. In particular, it assesses whether citizens are able to use the Internet and use it on a regular basis (Internet Users indicator) and whether they possess at least a basic level of digital skills (captured by the Basic Digital Skills, which measures whether citizens have at least basic skills in at least one of four Digital Competence domains: information, communication, content-creation or problem-solving).

Advanced skills and Development – concerns the workforce and its potential to maintain and grow the digital economy. It takes into account the percentage of people in the workforce with ICT specialist skills (ICT Specialists indicators) and the share of the population with STEM (science, technology, engineering and mathematics) education (STEM graduates indicator).

2.3 Human Capital dimension

Citizens that are empowered with an Internet connection and the necessary skills to take advantage of it can engage in a wide range of online activities. These can be through consumption of online content (e.g., entertainment such as music, movies, TV or games, obtaining media-rich information or engaging in online social interaction), through modern communication activities (e.g., performing video-calls), or through eCommerce. Nowadays this mix of activities can only be enjoyed to its fullest using the high-speed connectivity provided by a broadband subscription. Hence, these contentrich activities are among the drivers of the development of broadband networks. On the demand side, it is the possibility to perform these activities that drives users to subscribe to broadband connections. On the supply side, it is the need for the network capacity and speed to support such services that drives the supply of faster networks and better content delivery facilities. The Use of Internet dimension is divided into three sub-dimensions:

Content – measures the extent to which a country's Internet users get online content via their broadband connections. It uses four indicators to portray the country's consumption of content online: the percentage of Internet users that read news online (News indicator); the percentage of Internet users that consume music, videos or games online (Music, Videos and Games indicator); and the percentage of internet users that watch Video on Demand (Video on Demand indicator).

Communication – measures the extent to which a country's Internet users communicate and interact online using their broadband connections. To do so, it uses two indicators: the percentage of Internet users that do video or audio calls using the Internet (Video Calls indicator) and the percentage of Internet users that use social networks (Social Networks indicator).

Transactions – captures the propensity of Internet users to perform transactions online. It concentrates on two indicators: whether users go online to fulfil their banking needs (e-Banking indicator), or to purchase products or services (Shopping indicator).

2.4 Integration of Digital Technology Dimension

On the business side, digitization is one of the main contributors to enhanced economic growth. Adoption of digital technology (among which are new Technologies such as Cloud, Big Data, or the Internet of Things) to enhance efficiency, reduce costs or allow for closer engagement with customers, collaborators or business partners is becoming a mandatory requirement for being

competitive. This, together with the ability to use the Internet as a sales outlet, can contribute significantly to the modernisation of businesses and, ultimately, to their success. However, the integration of these technologies in the business sector cannot happen without the appropriate infrastructure, whether it is the availability of fast Internet or the availability of skilled workers in the labour market. The Integration of Digital Technology dimension is divided into two sub-dimensions:

Business digitization – takes stock of the level of adoption of digital technologies by a country's businesses. It focuses on five technologies: the sharing of information electronically inside companies via ERP (Electronic Information Sharing indicator), the use of Radio-frequency Identification technologies (RFID indicator), the engagement with clients, partners and other stakeholders via social media (Social Media indicator), the use of e-invoices (e-Invoices indicator) and the use of Cloud services of at least medium complexity (Cloud indicator).

eCommerce – focuses on the exploitation of the online sales channel by a country's small and medium enterprises. It captures this via three indicators: the percentage of SMEs that have sold online during the previous year (SMEs Selling Online indicator), the average turnover they realised from online sales (eCommerce Turnover indicator), and the percentage of SMEs that sold online to other EU countries (Selling Online Cross-border indicator).

2.5 Digital Public Services Dimension

Business and citizen interaction with the Public Sector can be improved and made significantly more efficient through the use of digital technologies. Such efficiency gains materialise both on the side of the Public Administration as well as on the business side. Public Administration can take advantage of technology to better address an ever more demanding set of business and citizen needs while at the same time realising significant cost reductions. With better and more streamlined Public Services, citizens and businesses gain in efficiency, both due to more functionality as well as to reductions in time spent. Furthermore, the use of electronic systems in areas such as public procurement or taxation can lead of significant gains by streamlining processes and increasing efficiency, improving transparency, and reducing the room for corruption or evasion. The Digital Public Services dimension is composed of one single sub-dimension:

eGovernment – captures the level of development of a country's eGovernment services. It does so using four indicators: the percentage of Internet users that have engaged with the public administration and exchanged filled forms online (eGovernment Users indicator); the level of sophistication of a country's eGovernment services (using the Pre-filled Forms indicator, which measures the extent to which data that is already known to the public administration is pre-filled in the forms that are presented to the user); the level of completeness of a country's eGovernment offer (using the Online Service Completion indicator, which measures the extent to which the various steps in an interaction with the

public administration – life event – can be performed completely online), and the government commitment to open data (by means of the Open Data indicator).

3 The Methodological considerations

Indicators used in the DESI comply with the following requirements:

- Must be collected on a regular basis. In order to fulfil the monitoring function, the indicators used in the index must be collected ideally on a yearly basis (or at least with a pre-defined regularity).
- Must be relevant for a policy area of interest. All indicators in the index must be accepted as relevant metrics in their specific policy areas.
- Must not be redundant. The index should not contain indicators that are redundant, either statistically or in terms of interpretation.

Some dimensions, sub-dimensions and individual indicators are more relevant than others, and for such a reason they are given higher weight in the computation of the final index score for each country. Figure 2 presents the overall weights attributed to the main DESI dimensions, which reflect the EU's digital policy priorities.

Dimension	Weight
1 Connectivity	25%
2 Human Capital	25%
3 Use of Internet	15%
4 Integration of Digital Technology	20%
5 Digital Public Services	15%

Figure 2 Weights attributed to the DESI dimensions

Source: DESI 2017, Digital Economy and Society Index, Methodological note, Updated: 2. March, 2017

Connectivity and Human Capital can be considered the most relevant dimensions because they represent the infrastructure of the digital economy and society. Hence, they are given higher weights. Integration of Digital Technology captures the use of ICT by the business sector, which, according to growth accounting theories is one of the most important drivers of growth. It is given a high weight, but not as high as the previous two dimensions. Finally, Use of Internet (by citizens) and Digital Public Services are enabled by the infrastructure and their contribution is strengthened by the quality of such infrastructure. For this reason, they are weighed less.

Weights are also assigned at the sub-dimension and individual indicator level. Weights used at the sub-dimension level are summarised in figure 3 (Since the weight assignment for sub-dimensions is local to the dimension that they are part of, then the sum of weights of the sub-dimensions within each dimension should add up to 100%.). Within Connectivity, Fixed Broadband and Speed are considered to be the most important sub-dimensions (weighted 33%), followed by Mobile Broadband (23%) and then by Affordability (11%). All the sub-

dimensions within the Human Capital and Use of Internet dimensions are considered of equal importance and are therefore weighted equally. When it comes to Integration of Digital Technology, the Business Digitisation dimension is more important than the eCommerce one, and therefore weighted higher at 60%. There is only one sub-dimension under the Digital Public Services dimension: eGovernment is weighted at 100%.

Sub-Dimension		Weight
1 Connectivity		
	1a Fixed Broadband	33%
	1b Mobile Broadband	22%
	1c Speed	33%
	1d Affordability	11%
2 Human Capital		
	2a Basic Skills and Usage	50%
	2b Advanced skills and Development	50%
3 Use of Internet		
	3a Content	33%
	3b Communication	33%
	3c Transactions	33%

Figure 3 Weights attributed to the DESI sub-dimensions

Source: DESI 2017, Digital Economy and Society Index, Methodological note, Updated: 2 March, 2017

For simplicity, all individual indicators within each sub-dimension are considered of equal importance and therefore weighted equally within the respective sub-dimension.

In DESI, the aggregation of indicators into sub-dimensions, of sub-dimensions into dimensions, and of dimensions into the overall index was performed from the bottom up using simple weighted arithmetic averages following the structure of the index (figure 1). As an example, the top-level DESI score for country C was calculated using the formula:

$$DE(C) = Connectivity(C) * 0.25 + Human\_capital(C) * 0.25 + Use\_of\_Internet(C) * 0.15 + Integration\_of\_Digital\_Technology(C) * 0.2 + Digital\_Public\_Services(C) * 0.15$$

Where $Connectivi(C)$ is the score obtained by country C in the Connectivity dimension, and so on for the remaining dimensions in the formula.

4 The Digital Economy and Society Index for Slovakia

Slovakia ranks 20th out of the 28 EU Member States in the DESI 2017, catching up in most domains, making substantial progress except for connectivity and integration of digital technologies. The Use of Internet dimension is where Slovakia is performing best compared to other EU countries and Slovaks have a

good level of digital skills. The sophistication of digital public services is expected to improve further, driven by recent initiatives in the public sector.

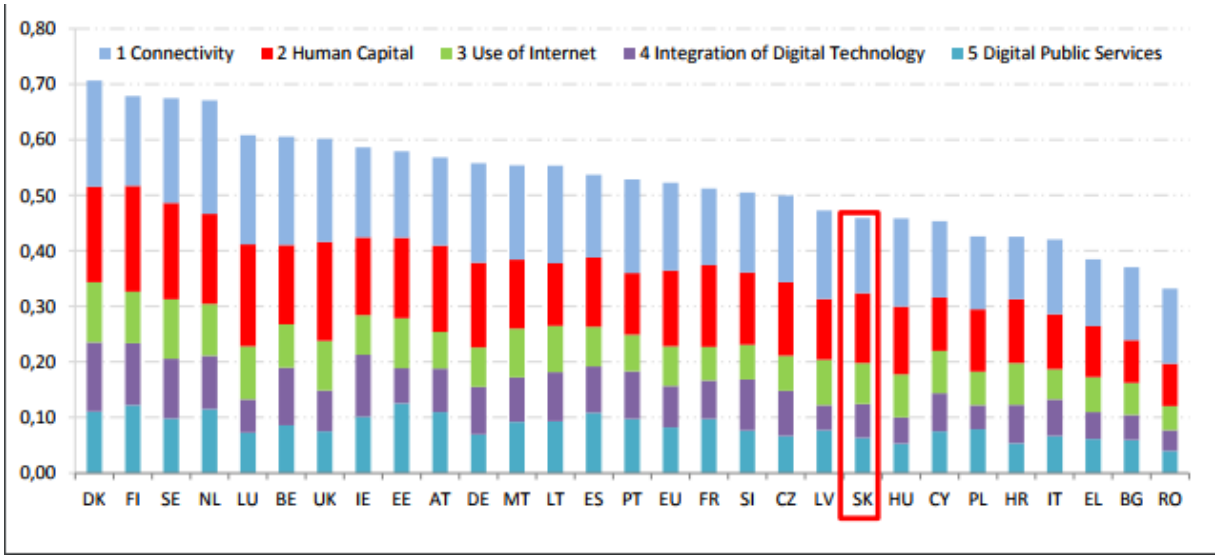

Figure 4 Digital Economy and Society Index – 2017 ranking

Source: https://ec.europa.eu/digital-single-market/en/desi

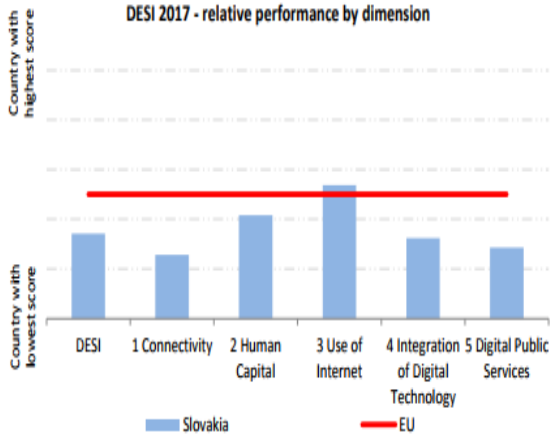

Figure 5

Relative performance by dimension

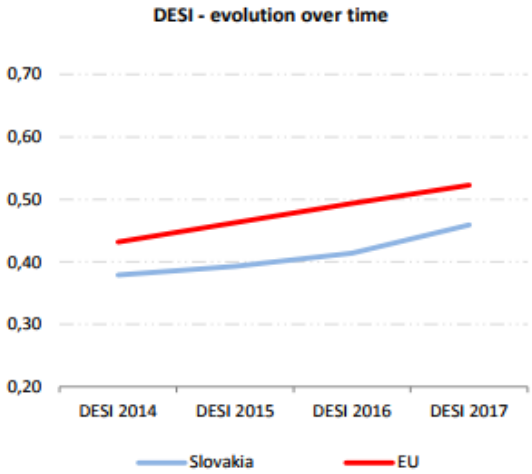

Figure 6

Evolution over time

Source: https://ec.europa.eu/digital-single-market/en/desi

Although Slovakia's overall performance in connectivity is somewhat stagnating, several indicators improved. While Slovakia has made some progress on fixed broadband coverage, with 88% of households covered (86% previously). In terms of high-speed broadband coverage, Slovakia with 75% NGA coverage performs almost at EU average (76%), which is a significant improvement from last year (67% in 2015). Fixed broadband take-up (72%), slightly below the EU average (74%), did not progress in 2016. 32% of fixed Internet subscriptions are to high-speed connections, which is lower than the EU level of 37%. Also mobile broadband take-up has stagnated (at 73%), placing Slovakia well below the EU average (at 84%).

4G coverage (80%) is slightly lower than the EU average of 84%. When it comes to spectrum, 80% of that resource has been licenced, compared to 2015, which was (86%) and to 68% EU wide. The reason for that is the ongoing assignment procedure in Slovakia, which started in August 2016 and continued in 2017. A citizen in Slovakia subscribing to a broadband connection must spend now on average 1.1% of his or her gross income, which is the same as last year and a bit less than the EU average of 1.2%. Slovakia is working on improving its broadband coverage and launched a public consultation on a list of NGA white areas. Slovakia has some difficulties in implementing the Broadband Cost Reduction Directive. Slovakia has given considerable attention to the major project "Atlas for passive infrastructure" and a list of white spots is a good example of progress being made. This list will serve as a basis for building backhaul networks using a state aid scheme at a later stage. Slovakia is investing considerable public funds in building a new backhaul network. The Slovak Republic also plans to support broadband deployment through demand oriented projects supporting the construction of last mile connections in places where the market fails. Slovakia plans to use co-financing for broadband deployment from several EU programmes. Although Slovakia's overall performance in connectivity is still below the EU average, almost all indicators have improved. The progress made in the allocation of spectrum and broadband infrastructure in 2016 is encouraging. However, a better, more efficient absorption on EU funds and the full implementation of the Broadband Cost Reduction Directive could further improve Slovakia's performance.

In the **Human Capital** dimension, Slovakia is making progress. The inhabitants of Slovakia are regular users of the Internet, and possess, on average, a level of digital skills comparable to the EU average. However, in view of the large importance of the manufacturing sector in Slovakia, workers need to be trained to make sure that they remain employable in an increasingly digital workplace. Addressing the shortage of certain ICT specialists remains crucial to support digital transformation. Stakeholders in Slovakia recently initiated the launch of a national digital skills coalition involving the government, the ICT industry, and other partners.

In terms of the propensity of individuals to use Internet services, Slovakia over the last year made steady progress and jumped from rank 17 to rank 15. Slovak Internet users read news online (74%), listen to music, watch videos and play games online (69%), watch films (7%) and make Video Calls over the Internet (57%). They use social networks (71%) and online banking (56%). Users in Slovakia tend to use Internet for online shopping more than Europeans (68% of Internet users compared to 66% for the EU28), rank 10 among the 28 Member States.

Slovakia made mixed progress over the last year made in **Integration of Digital Technology** by businesses. Whereas Slovak enterprises increasingly take advantage of the possibilities offered by social media and eInvoicing, progress of eCommerce and the use of cloud services were flat in 2016. Slovakia has been pursuing public support strategies for digitisation over the last years, in particular in support of its manufacturing industry but also for startups and SMEs. Manufacturing's share in employment in the Slovak economy is one of the highest in the EU. The Slovak Ministry of Economy established the Smart Industry for Slovakia Strategy which focuses on progress in the following areas: awareness-raising and collaboration, research, smart factories and manufacturing, access to finance, labour market, education and skills, future-proof regulation and smart government.

Digital Public Services – this is the area where Slovakia made very good progress, leaping from rank 27 to 23 in DESI 2017 and improving in all fields measured. Eventually, the considerable investments and efforts of the Slovak government over the last years in this domain are bearing fruit. Slovakia has made enormous efforts over the last years to catch up with other Member States, with the "National eGovernment Strategy" and an national master plan, built around a vision of an innovative and open state that provides citizens and businesses with userfriendly and easy to use services, while at the same time meeting future challenges. Slovakia also invests considerable funds from the EU Structural and Investment Funds in the development of electronic services for citizens and businesses, covering complex life events, cross-border interoperability and increasing the availability of government data through open data. At the same time, public administrative reform will be supported through digital technology, including the further extension of the government cloud. With an ambitious master plan and a bold programme, Slovakia is on track to further improve Digital Public Services for its citizens and businesses.

(https://ec.europa.eu/digital-single-market/en/news/europes-digital-progress-report-2017-country-profiles-telecom-country-reports)

Conclusions

Leading business experts agree that the digital economy is at its start. To compete in the years ahead, organizations whether they are for-profit businesses, service-oriented entities, such as healthcare systems, or nonprofit and government institutions will need both leaders and employees who are able to innovate.

They will need to leverage today's emerging technologies, such as IoT (internet of things) and prescriptive analytics, to better connect with existing and potential customers and to be more responsive while also being more efficient and effective.

Moreover, they'll have to be prepared to explore how best to develop or use emerging technologies or risk being left behind as the digital economy moves forward.

Digital transformation is not only a prerequisite for the future success of any business in any field but also an impetuous path that brings benefits to us all.

Acknowledgement

The paper is part *of project VEGA 1/0251/17 - Research and development of an innovative model for the costing of material and energy flows of a company.*

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M-PESA: THE INNOVATIVE PAYMENT SYSTEM IN THE THIRD WORLD COUNTRIES

Katarína PETROVČIKOVÁ – Jozef GAJDOŠ

Abstract
Nowadays the innovations in technologies are commonly used in every area of our lives. The paper deals with the specific system used preferably for sending and receiving money and as a mean of payment. The system is called M-Pesa and was first introduced in Kenya in 2007 as a tool for sending money through the texting using cell phones. Today with the Internet access it has become the unique and popular system with increasing numbers of users. The following paper will focus at the introduction, analysis and future perspective of M-Pesa.

Key words:
M-pesa, payments system, advantages and disadvantages of mobile banking,

Introduction

Innovations shape today's world in every area; whether it is healthcare, industry, business or even child care. Usually those innovations arise like a natural outcome of processes in their environment. The following paper is aimed at the introduction, analysis and future perspective of a revolutionary payment system predominantly being used in the so called third world. We will discuss M-Pesa system based on using smartphones by its registered users. Even though the system is preferably described as a tool to make the payments as convenient as possible; there is one important aspect that led to the launch of M-Pesa 10 years ago: poverty and thousands of people living in slums without access to any services including banking services as well. The possibility to use mobile phones for payment without going to a bank and having a classic bank account helped many to increase their quality of life and on the other hand led to the better business environment in the region.

Literature Review

Nowadays, for a company or individual to keep their market position; new ways of payment methods should be introduced to make the customer's convenience in terms of the payment for the product as good as possible. The ability to offer alternative ways to pay for the merchandise has become not only the matter of surviving on the market but one of the key elements leading to the further prosperity of a retailer.

Besides, the institutions offering innovative ways of payments (banks, internet providers, telecommunications companies, etc.) are trying to come up with the new products or with the cooperation to reach the synergic effect of the multiple ways how to approach a customer.

Today, the electronic systems usually offered on the market by various institutions are:

- electronic payment cards (debit, credit, and charge cards),
- e-wallets,
- virtual credit cards,
- mobile payments,
- loyalty and smart cards,
- electronic cash (E-cash),
- stored-value card payments.

Several research teams have tried to identify the most crucial factors effecting the payment through the various electronic systems. Special attention is paid to the role of mobile devices in the payment process. This idea comes from the elementary sign of those devices: one is always in the closest proximity to them and that make them the ideal tool possibly used in a payment process.

According to the findings of Bezhovski, Delchev and Misirkov (2016) in their research; these suggested that the use of mobile devices for making online payments was increasingly becoming popular due to a large user base of mobile phones. This payment method best suited micropayments and offered more convenient and secure payment transactions if appropriately implemented. Electronic cash systems were under way in achieving high uptake by consumers despite their strength to cater small and varied payments. A central challenge, for all these payment methods, is the provision of an authentication system that must ensure the security and convenience of each transaction made. They also examined factors affecting consumer adoption of mobile payment services.

As one of the most promising payment alternative the mobile banking arises. Using a smartphone has become our everyday custom and the producers are offering more and more ways to use them especially because even non-bank clients can use this form of payment.

According to Chandran (2014) there are specific advantages and disadvantages of mobile banking:

Advantages of Mobile Banking:

- Time saving: Instead of allocating time to walk into a bank, you can check account balances, schedule and receive payments, transfer money and organise your accounts when you are on the go.
- Convenient: The ability to access bank accounts, make payments, and even track investments regardless of where you are can be a big advantage. Do your banking at a time and place that suits you, instead of waiting in queues.
- Secure: Generally, good mobile banking apps have a security guarantee or send you a SMS verification code you need to input to authorise a payment for added security. Mobile banking is said to be even more secure than online/internet banking.

- Easy access to your finances: with the introduction of mobile banking, you can access your financial information even beyond the working hours. It helps to avail banking services even by making a call to the bank.
- Increased efficiency: mobile banking functions are functional, efficient and competitive. It also helps in decongesting the banking halls and reduces the amount of paperwork for both the banker and the customer.
- Fraud reduction: one very real advantage to implementing mobile banking is the fact that customers are being deputized in real time to watch their accounts.
- It utilizes the mobile connectivity of telecom operators and therefore does not require an internet connection.
- You can check your account balance, review recent transaction, transfer funds, pay bills, locate ATMs, deposit cheques, manage investments, etc.
- Mobile banking is available round the clock 24/7/365, it is easy and convenient and an ideal choice for accessing financial services for most mobile phone owners in the rural areas.

Disadvantages of Mobile Banking:

- Mobile banking users are at risk of receiving fake SMS messages and scams.
- The loss of a person's mobile device often means that criminals can gain access to your mobile banking PIN and other sensitive information.
- Modern mobile devices like Smartphone and tablets are better suited for mobile banking than old models of mobile phones and devices.
- Regular users of mobile banking over time can accumulate significant charges from their banks.
- There's currently no significant operating system supporting the mobile space. Hackers want to do the least amount of work for the biggest gain.
- Most mobile banking apps need an internet connection to be able to operate, so if you live in a rural area or experience problems with your internet connection, then you will not be able to access your account. The same applies if your mobile phone runs out of battery.
- Many phones are not yet compatible with anti-virus software. Most cell phones do not come standard with anti-virus protection even if they have the capacity to browse the internet.

They mention several major problems customers face using mobile banking:

- They are not sure about the safety of transactions,
- Mobile security,
- Network availability,
- Heavy charges for transactions,
- E-mail and web security,
- Identity theft,

- Literacy of people in some rural areas, especially in less developed countries,
- Not aware of innovation,
- Handset operate ability,
- Application distribution,
- Inadequate guidance.

European Union Agency For Network and Information (ENISA) has introduced the model of mobile payments and digital wallets threats.

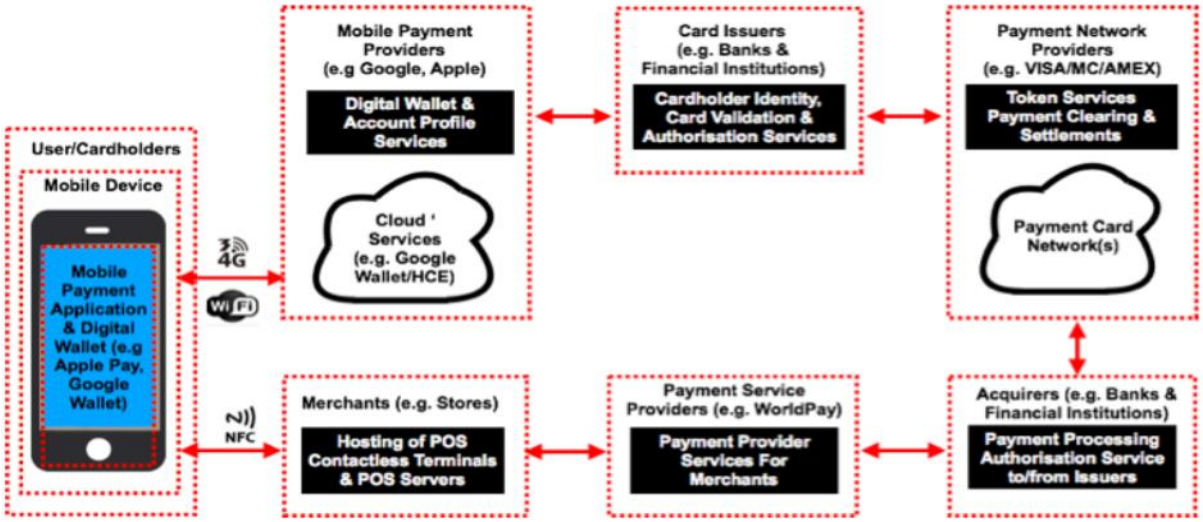

Figure 1 Mobile Payments and Digital Wallets Threat Model

Source: www.enisa.europa.eu (30. 9. 2017)

This model demonstrates the key structure of an eventual mobile payment system through the smartphone application enabling the customer to make an online purchase assuming all the parties are participating in this system.

M-PESA in Kenya: The Innovative Mean of Payment

Even though Kenya is a state located in Eastern Africa and is generally considered to be one of the lesser developed countries in the world it is also the place where revolutionary payment system was introduced 10 year ago.

The country is located in Eastern Africa with population exceeding 47 million inhabitants. According to UN, Kenya's GDP per capita was approximately 1300 $ in recent years which ranks Kenya among the most developed countries in the region. The majority of inhabitants live in rural area and agriculture is still dominant industry branch.

M-pesa is a transformative mobile phone-based platform for money transfer and other financial services. Pesa means money in Swahili, language commonly used as a second language in the region. The idea came from the researchers founded by UK's Department for International Development (DFID) which is the foreign aid branch of the British government. They facilitated a connection with

mobile service provider Vodafone. Vodafone had been considering ways to support microfinance through its mobile platform, as access to banking and credit was limited in Kenya and transporting cash was both risky and slow. At the beginning the the M-Pesa system was used as a simple method of texting small payments between users. Through the M-Pesa system, economic interactions in Kenya has been transformed. Its success reshaped Kenya's banking and telecom sectors, extended financial inclusion for nearly 20 million Kenyans. It has also its social value as a opportunity platform for small businesses and reducing poverty in the country. M-Pesa has been especially successful in reaching low-income Kenyans: the percentage of people living on less than $1.25 a day who use M-Pesa rose from less than 20 percent in 2008 to 72 percent by 2011.

Groups that typically have limited access to formal financial services have benefited from the financial products offered through M-Pesa.

In Kenya, M-Pesa has been so successful that traditional banks have come to see it as a serious competitor. At first, these banks sought to limit M-Pesa system was used as a simple method of texting small payments between users. Through the M-Pesa system, economic interactions in Kenya has been transformed. Its success reshaped Kenya's banking and telecom sectors, extended financial inclusion for nearly 20 million Kenyans. It has also its social value as an opportunity platform for small businesses and reducing poverty in the country. M-Pesa has been especially successful in reaching low-income Kenyans: the percentage of people living on less than $1.25 a day who use M-Pesa rose from less than 20 percent in 2008 to 72 percent by 2011.

Groups that typically have limited access to formal financial services have benefited from the financial products offered through M-Pesa.

In Kenya, M-Pesa has been so successful that traditional banks have come to see it as a serious competitor. At first, these banks sought to limit M-Pesa by seeking regulations from the Kenyan government, but increasingly they have begun to offer mobile banking services that attempt to disrupt M-Pesa's monopoly of the mobile money market. To compete, many of these services are offered with transaction fees that are even lower than M-Pesa's. As more players enter the system, the mobile money market may become even more widely accessible. The newest development shows that the Bank's Association will be targeting payments that exceed M-Pesas's maximum transaction above 70 000 Kenyan Shillings ($675).

The major player on Kenya's mobile market is Safaricom. As the company's latest annual report declares and as shown in Figure 2, the number of active 30 days customers is increasing and has almost doubled in the last four years. When evaluating customers in Kenya, certain aspects need to be considered and one with the major influence is poverty. That is one of the reasons why identification of 30 days active customers is essential.

Table 1 30 days active m-pesa users

Year	Customers in millions
2013	10,5
2014	12,2
2015	13,9
2016	16,6
2017	19,0

Source: own processing from Safaricom annual report 2017 available at www.safaricom.co.ke (30. 9. 2017)

In 2007, M-Pesa started with the simpliest method offering an option for everyone, even the poorest in the country to be able to send small amount of money without using cash. As the system was becoming more and more popular, more options were offered for M-Pesa users as shown in Figure 3. In 2013 M-Pesa offered the opportunity for both parties: customer and retailer to use this system for payments. Registered merchant has its specific code which the customer uses in the application of the mobile device for the retailer's identification and sends directly the money. Today, there are approximately 50 000 Lipa na M-Pesa active merchants, 130 000 agents and for M-Pesa there are 27 million registered users in Kenya. In 2016 M-Tiba was introduced as a mobile health savings product for the poor with no acces to a healthcare. And through this product the savings are redeeming at more than 350 clinics and hospitals.

Table 2 Evolution of M-Pesa in Kenya

2007	Simple Money Transfer
2009	Payment for Services (Kenya Power)
2011	International Money Transfer
2012	Savings and Loans
2013	Payments for Goods and Services (Lipa na m-Pesa)
2015	M-pesa comes home
2016	Value addition (API, Hakitisha, Statements)
2016	M-Tiba
2017	Safaricom App
2017	One - Tap

Source: own processing from Safaricom annual report 2017 available at www.safaricom.co.ke (30. 9. 2017)

M-Pesa is a system that has offered the less developed countries with the high percentage of poverty ability to use non-cash transfers by using just people's mobile device. It has offered this possibility for people who would not be able to open a bank account. As a payment system it struggles with the national banks and central governments. Sending money through a mobile device could be also misused and cause a threat to a national security. On the other hand, since each user has to register; the anonymity of the users is not the question. Despite is potential risks, the advantages of M-Pesa are prevailing and as a result the principle of this payment system is slowly spreading all around the world and especially in less developed countries as is shown in Figure.

Table 3 M-Pesa around the world Source: own processing

Country	Launch dates
Kenya	March 2007
Tanzania	April 2008
DRC	November 2012
India	April 2013
Lesotho	July 2013
Egypt	June 2013
Mozambique	March 2013
Romania	March 2014
Albania	May 2015
Ghana	August 2015

Source: own processing

The M-Pesa system is now available mainly in African countries, but has already launched in Europe: Romania in 2014 and Albania in 2015.

Conclusion

The paper deals with the introduction and the analysis of the revolutionary payment system M-pesa which was first launched in Kenya in 2007. The system allowed even low-income groups of customers to access and use various financial services. M-pesa is growing in terms of its users, services provided and countries adopting this system. The use of this system has gone through different phases and nowadays is widely accepted in central africa and is being implemented in states like Romania and Albania. The paper describes the theoretical background and presents the current usage of the system. For the future, research interest could be aimed at the more specific analysis of the M-pesa users and its possible adoption in EU countries.

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STRATEGIC PROSPECTS OF AGRIHOLDINGS OF UKRAINE IN THE CONDITIONS OF PROCESSES OF EUROPEAN INTEGRATION AND THE UNCERTAINTY OF AGRICULTURAL MARKETS

Oleksandr YERANKIN – Nataliia ZARYTSKA

Abstract
The article is dedicated to the development of large-scale companies (agriholdings) in agribusiness of Ukraine. The contemporary stage of land using by this companies is considered, the occurrence the scale effect is analyzed. Conceptual bases of substantiation of management of enterprises of the agroindustrial complex of Ukraine on the basis of current market strategies are developed. The regularities of the formation of agriholdings are represented and the prospects of their development in the conditions of processes of European integration and strengthening of global competition in the world agricultural markets are proved. The recommendations concerning to the main directions of realization of modern marketing strategies of agro-industrial units are given.

Keywords:
agribusiness, agriholdings, scale effect, strategy, management, globalization, European integration, agricultural markets.

Introduction

The development of agribusiness of Ukraine in the conditions of the impact of global market transformation is characterized by the retirement from the concept of individual farms to the growth of agriholdings. This process is particularly determined by the scale effect that can be completely achieved in large-scale companies.

Thus, the current stage of the development of agribusiness in Ukraine is characterized by a radical reconstruction of the institutional structure of the agrarian economy due to the processes of capitalization, globalization and European integration. These processes are completely natural and derived from the logic of market transformations in Ukraine. The specificity of the agribusiness requires the activation of the research activity with the aim of adaptation of knowledge of the strategic management to the features of economics of the enterprises of the agroindustrial complex.

1 Current status

The current scenario of the development of agribusiness in Ukraine is radically different from the initial evaluation of the global agricultural community on how Ukrainian agriculture should be developed in the post-Soviet period (the concept of individual family farms). As a result, we are observing a new phenomenon, when a group of powerful agro-industrial units – so-called agriholdings – was formed and provides the large-sized plots control, owns other assets in the food sector and puts major investments in agribusiness.

Based on the well-known world trends and according to the specificity of the agribusiness in Ukraine, the recommendations for forming the effective business strategies of enterprises of the agroindustrial complex of Ukraine should be developed with the aim of understanding the future prospects of this format of agribusiness. Systematization of various aspects of agribusiness provides the opportunities for the creation of the adapted scenarios of the development, including the consideration of the impact of globalization (Demyanenko, Yerankin and others, 2013).

The formation of the system of agriholdings as the structures with a complex system of intersectoral connections and often with global ambitions is not a random phenomenon, but the result of the reaction of business on favorable world market conditions (long-term trends related to the food problem in the world), which was implemented in the conditions of extremely large unrealized potential of agribusiness of Ukraine and institutional failures of the economy of Ukraine. Thus, agriholdings of Ukraine spontaneously formed institutions that were not formed at the macro level. This is a radical difference from the developed countries, including the EU, where the favorable market options for farmers are practically guaranteed on the state level.

That is what will determine the prospect of the existence and the development of agriholdings in Ukraine, which will increasingly move under the control of global capital. However, we can predict that in Ukraine a mixed agrarian economy will be formed, and their market niches will be actively won by small farms and traditional medium enterprises (like post-Soviet enterprises that are concentrated around the residents of one or two settlements and which have management that is adapted to market conditions). According to this, we can speak about the formation of three models of strategic management.

2 Strategic management of agriholdings under the impact of globalization

With the aim of adaptation of business to the impact of globalization, European integration and the changeability of global markets, it is necessary to define the basic tenets of the transformation of the strategic management of agriholding:

- deep diagnostics of own market opportunities with the aim to develop real business development strategies;
- the evaluation of prospects for direct global competition;
- clear business positioning;
- using the benefits from the "aboriginal" position (better knowledge of the specifics of doing business in the region);
- an innovative component of the development;
- using entrepreneurial energy of business which is developing,
- extensive using of outsourcing (is actual for the majority of Ukrainian agricultural producers because of the inability to organize the work of the marketing service by their own forces);

- active branding,
- socially responsible policy.

During the past 10-15 years, the business map in the agroindustrial complex of Ukraine has changed dramatically. However, in our opinion, these processes will only accelerate in the nearest future, because Ukraine's entry into globalization and European space is obvious, indisputable and all-consuming. Certain food markets have actually moved into the control area of global companies that have formed or are actively forming their own standards of doing business in these sectors of the industry, bringing them closer to the Ukrainian consumer. At the same time, it is possible to state the formation of a group of Ukrainian companies, who tried not to get lost in the cause of global competition and found the path of internationalization of business themselves. Thus, the implementation of an urgent modern concept of marketing, which is rapidly transforming on the basis of a new paradigm of development (Figure 1), into the business processes of enterprises of the agroindustrial complex of Ukraine, becomes very actual.

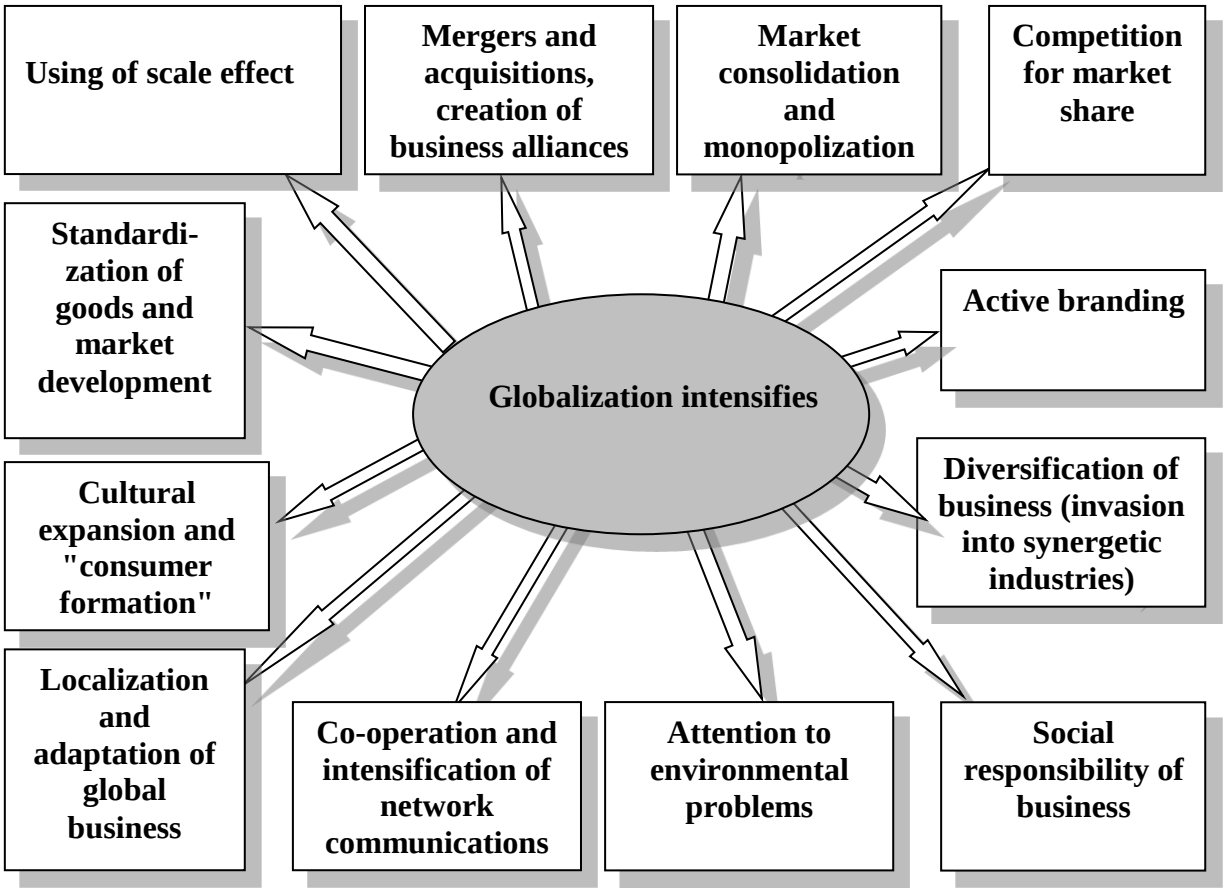

Figure 1 The main components of the marketing activity of enterprises of the agroindustrial complex of Ukraine, which the impact of globalization intensifies

Source: own processing.

For the development of recommendations for the subjects of agribusiness in Ukraine concerning to the intensification of their adaptation to the new realities of the globalization of the economy, in our opinion, it is necessary to identify the strategic areas of management in which such companies have more chances for success. For this we propose a matrix that shows the interaction of two key factors: the real market opportunities of Ukrainian companies and market niches, which are the most attractive for global companies and in which their capital is the most intensely involved (Figure 2 and Table 1).

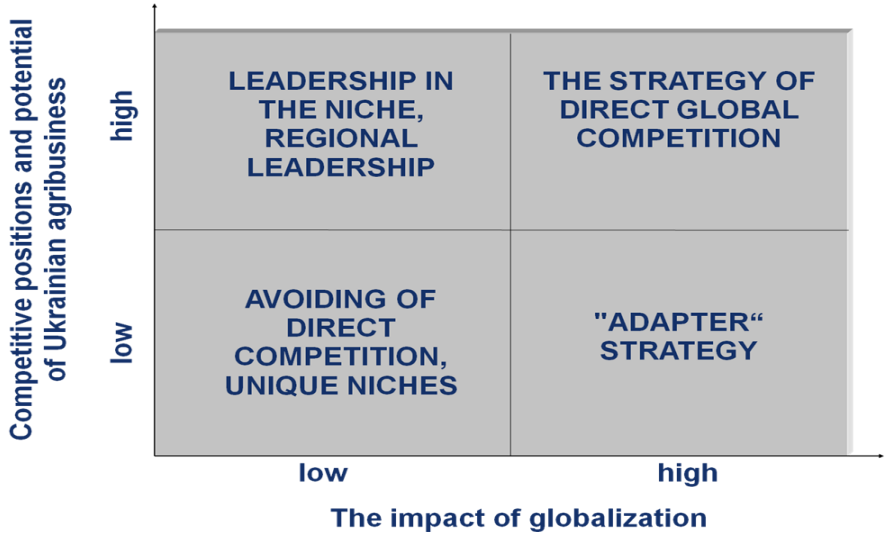

Figure 2 The matrix of directions of marketing strategies formation of agribusiness enterprises of Ukraine under the influence of globalization

Source: own processing.

Table 1 Conceptual directions of the formation of marketing strategies of enterprises of agroindustrial complex of Ukraine under the influence of globalization

Strategic zones of the matrix	Principle issues of marketing strategy
Leadership in the niche, regional leadership	- retention of positions; - stimulation of the "inclusion" of state institutions for support of protection against the strengthening of global competition
Avoiding of direct competition, unique niches	- own trademarks of intermediaries (private label); - franchising; - production of ecological products; - production of unique goods
"Adapter" strategy	- business development for resale purposes; - joint ventures, business alliances;- contract manufacturing; - franchising; - own trademarks of intermediaries (private label)
The strategy of direct global competition	- consolidation of business; - struggle for market share; - increasing of business capitalization; - access to international capital markets; - stimulating of the "involvement" of state institutions for support in global competition; - business out of Ukraine (export intensification, organization of production, intake of assets abroad); - formation of own strong brands

Source: own processing.

Thus, companies use strategic approaches to leadership in the niche or regional leadership in segments that are mainly dependent on the state regulation of these markets: the production of bakery products (prices for final products, norms of profitability of producers, access to the availability of resources at preferential prices, compensation of the difference in the price from local budgets is controlled by the municipal administrations), the production of alcohol products in Ukraine (access to alcohol produced by alcohol companies with a state monopoly), sugar production (protection of the national market from the access to cheap raw materials). In addition, this may be the production of specific products, which attracts a limited range of consumers (for example, brewing barley by "Obolon" company in Ukraine).

"Adapter" strategy is relevant for medium-sized companies that cannot reach the level of direct confrontation of the global companies, or do not have the required level of qualification and ambitions for this. The main "weapon" of such entrepreneurs is the acquired specific experience of their ability to work in conditions of imperfect and unpredictable for foreigners' market environment of agribusiness. In addition, local companies know better the "secret" of access to the wallet of local residents, taking into account mentality characteristics. Therefore, such subjects of agribusiness realize that they may be attractive to global companies as specific "drivers" (at least for a certain period) in order to facilitate adaptation to the peculiarities of the marketing environment of the agroindustrial complex of Ukraine. The directions of cooperation of Ukrainian companies with foreign ones in the course of joint promotion of trademarks, contract production of products, creation of joint ventures, sale of a part of share capital to strategic investors, and franchising are quite popular. The ways of integrating small companies with key players in the market, with retail chains for example, which in the certain period (mid-2000s) actually dominated on the market for selling agri-food products and were able to "dictate" their conditions even to key producers (this was compounded by the intensification of competition between producers for the access to trade shelves), became more and more popular. Therefore, the production of agri-food products under the brands of well-known trade agents and other intermediaries (private label) is becoming increasingly popular. In case of resale of business to global companies, there is a possibility that the last owners and managers of these companies will be involved to work in the business of new owners as adapted managers (perhaps with a motivating purpose to leave part of their share capital in their hands).

And, finally, we can observe the formation of a group of Ukrainian companies with global ambitions that are trying to deal with "globalizators" with their own weapon through the merger of companies' efforts, the intake process or participation in the capital, the entry into the stock market, the creation of strategic alliances or vertically integrated agribusiness structures, the introduction of long-term contracts etc. In the agrarian sector, among the examples of such companies

are the most well-known Ukrainian agroholdings ("Nibulon", "Kernel", "Myronivsky Hliboproduct", "Astarta", "Ukrlandfarming" and others), which hold strong positions in the national markets and create real competition with global companies in foreign markets, have relatively easier access to cheap credit resources and investment capital (Yerankin, 2009).

3 Barriers and opportunities for global companies in agribusiness of Ukraine

There is the actual idea of the advantages of large-scale production (it is possible to control the level of cost below the average in the industry), the synergetic effect of vertical integration (with processing and trade) for agro-industrial formations In fact, they provide the functions of state institutions to ensure the food safety in Ukraine. That gives them the opportunity in a certain way to "implement" their own business models with the reserves of the system of government protection and protectionism. The strategy of direct global competition has become crucial for companies in the food sector, whose business is not limited by Ukrainian market. At the same time, even stabilization of leadership positions cannot protect from the acquisition of such companies by TNCs, which have an incomparably greater financial capacity for transactions, as evidenced by world experience.

It is necessary to remember that, in the context of the intensification of globalization processes and the imperfection of the state system of protection against them in Ukraine; it is idly to focus on the long-term effect of protective mechanisms against such influence. This is accentuated by the fact, that global companies have been actively engaged in removing obstacles for a capture of a vital unobservable space in Ukraine (Table 2).

Table 2 Factors of the marketing environment of Ukrainian agribusiness enterprises, which create barriers to penetration of global capital, and ways to overcome them

Factors that counteract the effects of globalization	Options for overcoming obstacles byTNCs and global capital
Preference for national business, financial support	- buying business in Ukraine; - entering into the capital of Ukrainian companies; - creation of joint ventures with local companies; - "pressure" on the state institutions of Ukraine through international organizations for reducing such preferences;
Lobbying of local business structures by government institutions	- buying business in Ukraine and entering into the capital of Ukrainian companies; - participation in financing of political forces in Ukraine; - "pressure" on state institutions of Ukraine through international organizations for reducing such support;
Prohibition, restrictions for foreign companies in some spheres of economics (for example, buying of agricultural land)	- buying business in Ukraine; - entering into the capital of Ukrainian companies; - creation of joint ventures with local companies; - creation of affiliated legal entities (the effect of "corporate veil");
Corruption	- "a game by accepted rules"; - protection of own interests through powerful international institutions; - cooperation with local businessmen for solving problems;
Political and economic instability	- stimulation and control of powerful political forces; - adaptation (acquired experience); - cooperation with local businessmen; - protection of own interests through powerful international institutions;
Specificity of national traditions, culture, lack of experience	- adaptation; - slow incursion into the market; - expansion of global culture into the Ukrainian space; westernization; - cooperation with local businessmen and buying of local brands;
Strength of local brands (consumer loyalty)	- buying of local brands and their development; - benchmarking; - abuying and "cannibalization" (reducing of significance, gradual destruction) of local brands; - cooperation with local businessmen;
Antiglobalism	- buying business in Ukraine; - masking, concealing of global sources; - activation of social responsibility;

Source: own processing.

The main areas of such actions are either using of the protection of the parent structures related to the intergovernmental influential organizations and governmental institutions of these countries that have the opportunity to influence on the adoption of state decisions in Ukraine for example, accelerating of returning VAT or canceling the prohibition to export goods), or the successful

"masking" of the global origin of capital as one of the entities of the Ukrainian market, which gives the possibility to circumvent the restrictions for foreign companies concerning to doing business in Ukraine.

The requirements of global competition formed the strategic alternatives of agriholdings, such as: active capitalization and aggressive development; moderate expansion; integration and cooperation; protection strategy; timely sale of business.

The consequences of the global economic crisis and the crisis related to the historical events in Ukraine in 2014-2016 years had radically changed the vectors of forming strategies in most Ukrainian companies. The main factors that put agribusiness in complete dependence on the state of the macroeconomic situation, in our opinion, are: aggressive unbalanced development that was based on the incorrect perceptions of future market trends; classic signs of getting into the "trap" zone of financial speculation; unbalanced fiscal policy; unqualified actions of management of companies; fraudulent actions of entrepreneurs, etc.

In better position in the crisis were those companies that had implemented the strategy of "organic growth" and had built vertically integrated agro-industrial holding companies, which export much of their production (hedging) or produce a wide range of food products with a high added value.

4 The scale effect in agriholdings of Ukraine

The concept of the scale effect refers to the microeconomic theory of production and costs. However, the applied analysis of the scale effect in agriholdings of Ukraine actually has not provided before. The criterion of the selection of enterprises is the size of farmlands with further studying of the scale effect in these companies.

Practical researches in the world [1, 4] prove that the relationship between farm size and efficiency is one of the more persistent puzzles in development economics, even more so as many potential determinants have been put forward and tested without being able to provide a fully satisfying explanation. Researchers mentioned that the findings from this study suggest that gains from improving technical efficiency exist in all farm categories but they appear to be much higher on large than on small farms. These results indicate that large scale farms have a higher technical efficiency than small scale farms.

It should be noted that the returns to scale is considered as a long-term concept that reflects how the size of production changes when all inputs are proportionally increasing. Constant returns to scale is a situation when a proportional increasing of all inputs leads to the same proportional increasing of outputs. Increasing returns to scale is when the proportional increasing of all inputs leads to more than proportional increasing of outputs. Decreasing returns to scale occurs when the proportional increasing of all inputs leads to less than proportional increasing of outputs.

The assumption that the enterprise works with constant returns to scale (CRS) appropriate when all companies work with optimal scale, but there are some restrictions for this. Therefore, measuring the efficiency of the scale, it is suggested that the company is working with variable returns to scale (VRS). Thus, Data Envelope Analysis (DEA) allows estimating the efficiency of the scale for each observation.

Formally, Farrell's efficiency of the scale is represented as:

$$S\hat{E}_O(x,y) = \frac{T\hat{E}_O(x,y \mid CRS)}{T\hat{E}_O(x,y \mid VRS)} \quad (1)$$

$T\hat{E}_O(x,y \mid CRS)$ - DEA estimation of $TE_O(x,y)$ for the assumption of CRS, and $T\hat{E}_O(x,y \mid VRS)$ - DEA estimation of $TE_O(x,y)$ for the assumption of VRS (Demyanenko, Nivievskyi, 2009).

It was found 139 companies that rent more than 10 thousand ha of farmlands, according to the State Statistics Committee, but only 129 companies were valid for the analysis.

During the application of DEA with the help of OnFront 2.0 for measuring the scale effect in these observations (companies), it was introduced following variables: x1 – the average number of workers employed in agriculture, people; x2 – farmlands, ha; y1 – grain production, centners; y2 – sunflower production, centners; y3 – sugar beet production, centners; y4 – cattle breeding (in live weight), centners; y5 – hogs (in live weight), centners; y6 – milk production, centners. We distinguish three groups of agriholdings: the first group – companies that rent from 10 000 to 20 000 ha, the second group – from 20 001 to 50 000 ha, the third group - 50 000 ha and more (Zarytska, 2015).

Table 3 The scale effect and technical efficiency in agriholdings of Ukraine

The group of agriholdings depending on the land in rent	The number of agri-holdings in groups	The average value of technical efficiency for constant scale effect, Fi(y,x | C,S)	The average value of technical efficiency for variable scale effect, Fi(y,x | V,S)	The average value of scale effect, SEi
I 10 000 – 20 000 ha	86	0,59	0,87	0,67
II 20 001 – 50 000 ha	35	0,61	0,69	0,86
III 5 001 ha – and more	8	0,67	0,95	0,72
Total	129	X	X	X

Source: own processing on data of the State Statistics Service of Ukraine.

Thus, the observable enterprises have a reserve for further increasing of production by improving the technical ratio and combining resources, but, on the other hand, the average value of scale effect for all groups (0.75) is rather high and shows the high level of scale effect for large farms.

Consequently, at the time of growing of the average technical efficiency at the constant returns to scale with the growing of cultivated farmlands, average technical efficiency at the variable returns to scale and the average scale effect increase only for the second group of companies, comparatively to the first group. For companies of the third group the corresponding indices are higher than for the first group, but lower than for the second. However, for a deeper analysis, each individual observation should be considered.

Conclusion

In Ukraine, unlike traditional European conditions (domination of small farms), a unique institutional structure of agribusiness was formed, in which large integrated corporations – agriholdings – play a special role. For adaptation to global competition and the requirements of European integration, these companies apply modern marketing strategies. We proposed a new methodology for developing such strategies – a matrix that shows the interaction of two key factors: real market opportunities for Ukrainian companies and market niches, which attract global companies and in which their capital the most intensively involved. This will help agribusiness entities in Ukraine and foreign investors to invest the capital and intensify their adaptation to the new realities of globalization of the economy through the definition of strategic economic zones in which such companies have more chances for success.

It can be argued that the majority of Ukrainian companies was fully adaptive to the effects of the crisis and continues to implement strategic plans, and some companies also received additional opportunities to accelerate the capture of the market. We distinguish such main directions of realization of modern marketing strategies by agriholdings, as: merging and consumption; organic increasing of the land bank; maximum self-sufficiency of raw materials or integration with suppliers; investments in energy efficiency and modernization; business diversification; focusing on market niche; infrastructure development; large-scale implementation of complex investment projects; access to foreign markets; improvement of business management, restructuring of the organizational structure and so on.

Thus, the aggregate data about the scale effect in agriholdings allow making the conclusion that the maximum scale effect (0.86) achieved in companies of the second group (35 observations). At the same time, companies of the third group (8 observations) also achieved high scale effect (0.72), which is higher than in the first group (86 observations) with the average scale effect 0.67. So, the observable enterprises have a reserve for further increasing of production by improving the technical ratio and combining resources, but still show high level of scale effect.

In the context of the intensification of globalization processes, global companies find ways and have a wide range of instruments for overcoming barriers for penetration into Ukrainian agrarian market. So, the requirements of global competition formed the strategic alternatives of agriholdings in Ukraine.

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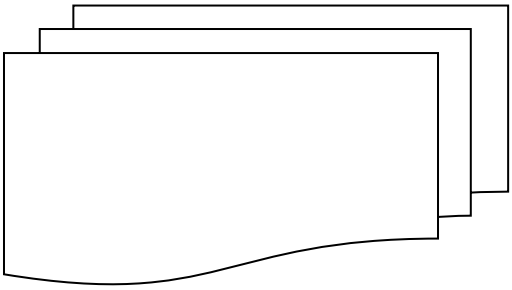

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ISSN 1337-6020